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PAPER TRADE JOURNAL

FEBRUARY 24, 1944

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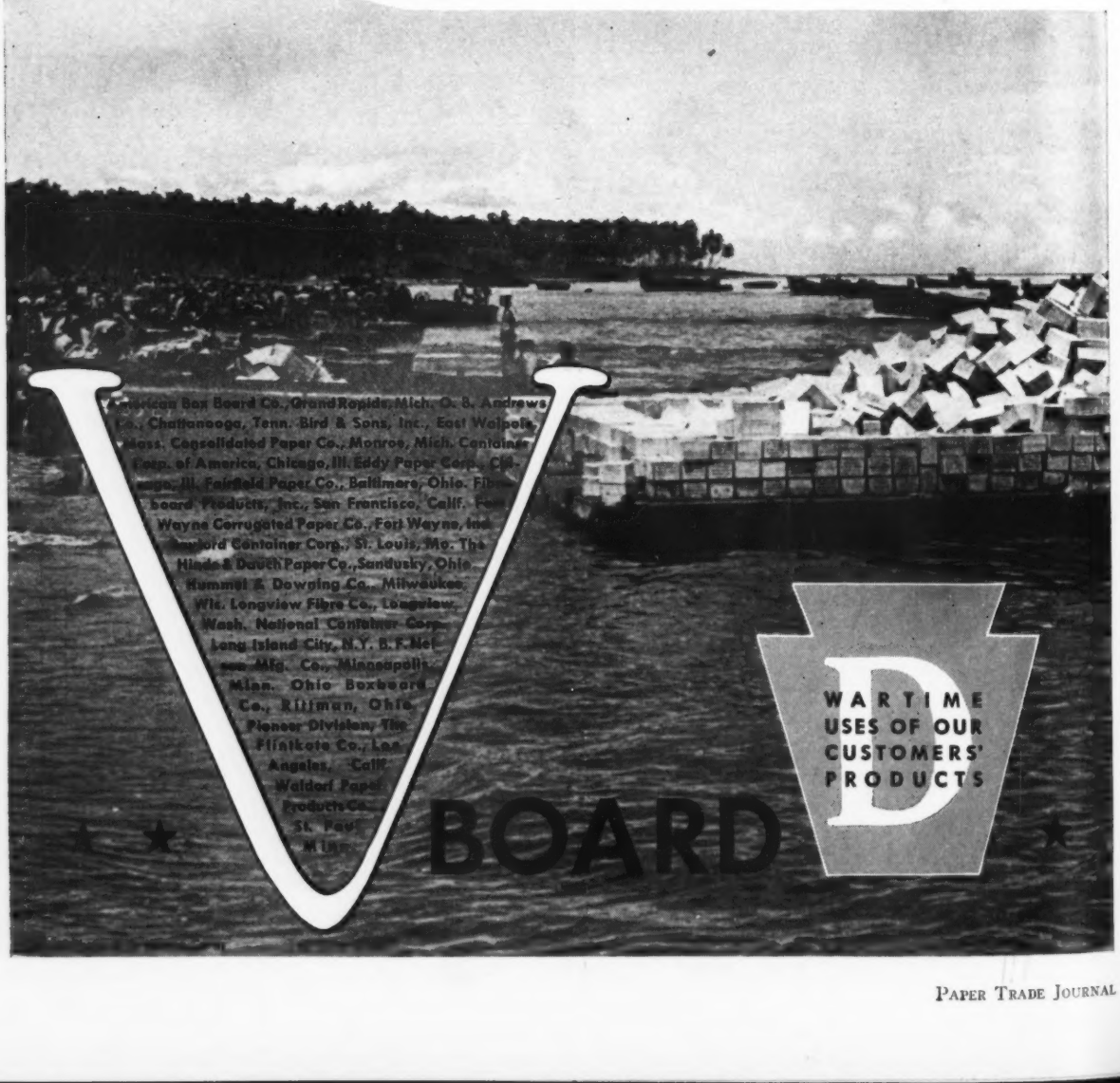
American Box Board Co., Grand Rapids, Mich. O. S. Andrews Co., Chattanooga, Tenn. Bird & Sons, Inc., East Walpole, Mass. Consolidated Paper Co., Monroe, Mich. Container Corp. of America, Chicago, Ill. Eddy Paper Corp., Chicago, Ill. Fairfield Paper Co., Baltimore, Ohio. Fibreboard Products, Inc., San Francisco, Calif. Fort Wayne Corrugated Paper Co., Fort Wayne, Ind. Gaylord Container Corp., St. Louis, Mo. The Hinde & Dauch Paper Co., Sandusky, Ohio. Hummel & Downing Co., Milwaukee, Wis. Longview Fibre Co., Longview, Wash. National Container Corp., Long Island City, N.Y. B. F. Nelson Mfg. Co., Minneapolis, Minn. Ohio Boxboard Co., Rittman, Ohio. Pioneer Division, The Flintkote Co., Los Angeles, Calif. Waldorf Paper Products Co., St. Paul, Minn.
V
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Title Reg. U. S. Pat. Off.

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PAPER
TRADE JOURNAL
Title Reg. U. S. Pat. Off.

Vol. 118, No. 8 Thursday, February 24, 1944 Price Ten Cents

Allocate More Material for Mill Machinery

War Production Board Announces Increased Amount of Controlled Materials Will Be Provided For Manufacturing New Paper, Pulp, Converting Equipment — Production Must Be Outside War Work.

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 23, 1944—The allocation of controlled materials for the second quarter of 1944 will include an increased amount to be used for the manufacture of new pulp, paper mill and converting machinery, the War Production Board Paper and Paperboard Divisions announced today. These additional materials are to be used for equipment that will aid in handling and preparing waste paper or otherwise improving production to guarantee the essential requirements for paper and paperboard.

The conditions on which the materials will be distributed to the manufacturers, on a basis to be determined by the Paper and Paperboard Divisions, follow:

The manufacture of paper mill equipment must be outside of any war activities and, it is specifically emphasized, there must be no interference with such war work. No additional employment will be permitted for the specific purpose of making paper mill machinery, nor will additional materials be allotted to manufacturers situated in critical labor areas.

Since the materials available will not be sufficient to meet all of the requirements of all pulp, paper, paperboard and converted products, the distribution of equipment will be based on the returns that can be anticipated by its use. The industries involved will receive instructions within the next few days on procedure for obtaining both materials and equipment, officials of the Paper and Paperboard Divisions said.

Waterproof Paper Demand Doubles

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 23, 1944—Demands for commercial types of waterproof papers in 1944 will approach 50,000 tons a month, including extensive Army requirements, G. E. McCorison, of the War Production Board's Paper Division, told members of the Paper Shipping Sack Industry Advisory Committee, WPB announced today.

Since August last year, demands for waterproof paper have nearly doubled, largely because of military requirements, Mr. McCorison said. Military needs include 4,000 to 5,000 tons a month for shell cases, as well as large amounts to make waterproof tarpaulins for landing posts and beachheads. Due to an anticipated "open-air" storage of 70% of supplies going abroad to liberated countries, Mr. McCorison emphasized that almost every shipping bag must be constructed of asphalt laminated paper to keep products dry.

"Waterproof" is a term for a water-repellent paper prepared by combining two sheets of paper by means of asphalt or by impregnating or coating paper with a suitable material, Jean E. Zeller of the Containers Division, explained.

For the first quarter of 1944, the WPB Requirements Committee has allocated 26,150 tons of kraft and 2,500 tons of asphalt laminated kraft each month for manufacturing multi-wall bags, believing less multi-wall bags would be required by the claimant agencies than the manufacturers estimated. The amount of kraft was reduced from a total of 29,000 tons a month requested by the industry, WPB officials reported, representing a cut of approximately 10 per cent.

H. O. Nichols of the Paper Division pointed out that the cut was made only because the Requirements Committee considered certain other demands for similar raw materials more important than the demands of the paper shipping sack industry, the most important of which was, waterproof paper.

The members of the industry present were told by WPB officials that sufficient kraft paper to supply the waterproof paper manufacturers for the first quarter had now been secured and that efforts to bring production to 100 per cent of capacity were being made. Some relief within approximately sixty days was anticipated.

Representatives of the paper shipping sack industry declared themselves willing to take any cuts in production which WPB considered necessary, but said that they did not feel they should make decisions concerning relative essentiality of end uses, believing WPB must determine where cuts should be made.

Production of paper shipping sacks last year should not be compared with production in 1941 or 1942, W. Harlen Bird of the Conservation Division told the committee members.

Twin City Safety Council Meets at Neenah

Large Attendance From Paper Mills Present At Opening of First Winter Series of Meetings—Badger Paper Mills Re-elect Officers—Kimberly Mill Workers Buy 9,408 War Bonds — Other News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., February 21, 1944—Paul Manning, Columbia Broadcasting System's foreign correspondent, was the speaker at the first of a series of winter meetings under auspices of the Twin City Industrial Safety Council at the high school at Neenah, Wis., Tuesday evening, February 15. There was a large attendance from paper mills and allied industries of Neenah and Menasha, Wis.

Mr. Manning's subject was "Skywar Over Europe." He described his experiences in flights with the American Eighth Air Forces on a number of its operational missions, and showed two reels of films he brought back to the United States.

H. H. Aderhold, safety director of the Menasha Products division of the Marathon Paper Mills Company, Menasha, presided at the session, and the ushers were women employed at the mill. A welcome was extended by Francis T. Rooney, chairman of the council, who is safety and health director of the George Banta Publishing Company, Menasha.

A demonstration of fire and explosion hazards was put on by I. F. Staetz of Madison, Wis., fire prevention deputy of the Wisconsin Industrial Commission. The high school band of Neenah furnished a preliminary concert.

Badger Paper Mill Reelects Officers

Directors and officers of the Badger Paper Mills, Inc., Peshtigo, Wis., were reelected at the annual meeting of the company at the company's offices February 12. They are: J. P. Pulliam, Milwaukee, Wis., chairman of the board; E. A. Meyer, president and general manager; H. L. Haslanger, Marinette, Wis., J. B. Angle, Milwaukee, and C. W. Hoeper, Menominee, Mich., vice-presidents. J. W. D. Liginger, Milwaukee, secretary-treasurer, and F. J. Lauerman, Marinette, director.

In celebrating the fifteenth anniversary of the founding of the company, President Meyer was tendered a testimonial dinner by the Lions Club of Peshtigo at Cholette hotel Monday evening, February 14, with 95 business and professional men attending.

Norman Langill, district attorney of Marinette County, was the speaker. He pointed out the progress of the company under Mr. Meyer's management from 1929 up to the present time, remarking the the company took an active interest and supported wholeheartedly civic improvements including the school system, the city drinking water supply and recreational activities.

"Commencing its operations practically on the threshold of the recent depression," said Mr. Langill, "the Badger Mills have forged steadily to the front in the paper industry in spite of adverse business conditions during this period. Its progress has been steady and constructive and the entire operation is a tangible tribute to Edwin A. Meyer and to the men who have carried into execution his policies in corporate management and public relations."

The speaker also mentioned that under normal operating conditions the company employs 425 persons, 66 of whom are now in the armed forces. In 1929 there were 176 employees, with a payroll at that time of $212,000, which in 1943 had increased to $640,000.

Mr. Meyer responded with expressions of appreciation. Talks also were made by Mr. Pulliam, chairman of the board, and Mr. Angle, vice-president, who presented Mr. Meyer with several gifts as tokens of appreciation from the board of directors.

Paper Mills Assessed Water Falls

Water Power tolls amounting to $132,000 have been assessed by the Chippewa and Flambeau Improvement Company for the last six months of 1943, and will be reviewed at a hearing by the Wisconsin Public Service Commission at Madison, Wis. February 29.

Included in the assessments are: Flambeau Paper Company, Park Falls, $18,423; Lake Superior District Power Company, Ashland, $15,352 and at Ladysmith, $3,805; Cornell Wood Products Co., Cornell, $9,406; Northern States Power Co., Eau Claire, $71,541, and Eau Claire Dells Improvement Company, $13,228.

Mill Workers Buy 9,408 War Bonds

Employees of the Kimberly-Clark Corporation's mill at Kimberly, Wis. purchased 9,408 war bonds last year, totalling $227,743.23, according to figures recently compiled. The figures also show that 97% of the workers are buying through the payroll deduction plan, and that more than 90% of the workers are buying through the payroll deduction plan, and that more than 90% are investing 10% or more of their earnings.

In the company's Lakeview mills at Neenah, Wis., 47% of the departments were 100% purchasers during a bond day conducted recently among the Women in Production Service, the new organization recently inaugurated to stimulate war production and war activities participation. About 95.6% of the entire feminine personnel participated in purchases.

Paper Men Elected Insurance Directors

Several paper mill executives were reelected as directors by the Employers Mutual Liability Company and the Employers Mutual Fire Insurance Company of Wausau, Wis., at the annual meeting last week. M. P. McCullough of Chicago, treasurer of the Masonite Corporation, was reelected chairman of the board, and three who were retained as vice-presidents are D. C. Everest, president of the Marathon Paper Mills Company, Rothschild, Wis., A. P. Woodson, president of the Mosinee Paper Mills Company, Mosinee, Wis., and Charles S. Boyd, president of the Appleton Coated Paper Company, Appleton, Wis. Ben Alexander of Chicago, president of Masonite Corporation, was reelected a director.

The company has a premium income of $29,015,081 in 1943, an increase of 7.8 per cent over 1942. Assets for 1943 totalled $42,217,700, and dividends declared during the year to policyholders totalled $5,284,006. Fire insurance premiums totalled $502,548 at the close of 1943; assets were $912,558, and dividends to stockholders were $98,331.

J. B. Catlin Talks on "Statistics"

John B. Catlin of the Kimberly-Clark Corporation, Neenah, Wis., gave a lecture on "Statistics, a Way of Thinking," at a meeting of the Northeast Wisconsin section of the American Chemical Society at Lawrence College, Appleton, Wis. February 17. He also gave the same address to the Engineers' Club of Kimberly-Clark at a dinner at Hotel Menasha, Menasha, Wis., February 16.

Reichhold Research Expanded

Henry H. Reichhold, chairman of the board of Reichhold Chemicals, Inc., Detroit, Mich., announces that the personnel of RCI research laboratories has been enlarged about 25% during the past few months and, further, that all work of RCI research laboratories is being centralized at the main plant in Detroit, where a rather complete program of reorganization has taken place.

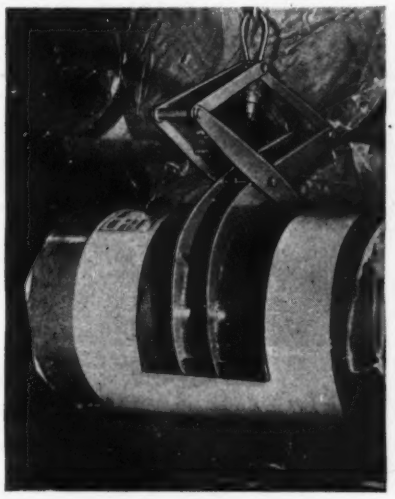
Heading up RCI's reorganized research department is John J. ("Jack") Bradley, Jr., director in charge of research. Mr. Bradley, in addition to supervising the direction of all activities concerned with research policies, programs and personnel, also acts as liaison officer between the research department and the company's executive research advisory board, which is composed of the following members: Chairman—C. J. O'Connor, president; Co-Chairman—John J. Bradley, Jr., director in charge of research; Advisory Members—Henry H. Reichhold, chairman of the board; Albert G. Goetz, secretary and vice president in charge of legal affairs; Paul L. Swisher, vice president in charge of sales and advertising; S. H. Baum, vice president in charge of eastern Resin Plant; T. P. Brown, general manager of chemical color division; P. J. Ryan, vice president in charge of production at Detroit plant; H. L. Wampner, director of technical sales service at Pacific Coast Plant; and Carl H. B. Jarl, chief engineer at Phenol Plant in Tuscaloosa, Ala.

RCI's research laboratory is now divided into seven separate and distinct units, each in charge of and directed by the men named below: Division of Coating Resins—A. G. Hovey, Division of Phenol Plastics—Harry Kline, Division of Chemicals—Arthur C. Lansing, Division of Chemical Pigments—Harold E. Weisberg, Division of Patents—A. G. Hovey, Division of Market Research—J. Frank Maguire, Division of Special Compounds—Dr. E. F. Siegel.

In commenting upon the expansion, reorganization and centralization of his company's research laboratories, Mr. Reichhold emphasized the fact that his company is still "hewing to the line" on the proven theory that research must be an intimate part of management, one of the chief businesses of a business, and insurance against capital loss which creates a future obligation . . . the obligation to steady growth which is necessary to pay off the capital attracted and to release said capital for future use.

Steel Tongs for Newsprint

Leather-Lined steel tongs developed for the newsprint industry by the Heppenstall Company, Pittsburgh, lift heavy rolls of paper without marring them. The tong represented in the illustration has a maximum diameter of 38 inches, and a lifting capacity of 3,000 pounds. Designed for mill and warehouse



Leather Lined Steel Tongs

use, it is suspended from an overhead crane and operates automatically. The thick hide lining provides a firm grip on the roll. The tongs are built to any specifications.

Understanding Your Income Tax

Detailed instructions for figuring correctly such items as your Victory tax credit and the unforgiven part of your 1942 income taxes, which will have to be paid March 15, are contained in the 1944 edition of Understanding Your Income Tax, published by the National Association of Manufacturers.

Designed primarily for association members to distribute to plant personnel, this booklet attempts to simplify and uncomplicate for the average taxpayer the most complicated income tax form in history.

The "fellow named Joe," popularized in the 1943 edition of the tax booklet, resumes his step-by-step journey through this year's maze of questions to find out whether he has to pay some more money or whether he has a refund coming.

The back cover of the booklet is devoted to income tax information concerning those in the armed forces.

The 1943 edition of "Understanding Your Income Tax," a "best seller" among NAM publications, again will be available in bulk at a cost of $4.00 per hundred by writing George Douglas, Director, Government Finance Department, National Association of Manufacturers, 14 W. 49th St., New York 20, N. Y.

B. H. Metternich Elected a Director

B. H. Metternich, manager of the plant of the Marathon Paper Mills Company at Ashland, Wis., has been elected a director of the Ashland, Wis. Union National Bank. Mr. Metternich has served on the board of directors of this bank for the past ten years.

Curb Pick Up of Waste Paper Nets $25,000

Chicago Collects and Sells 62,500 Bundles of Paper Stock Weighing 5,000,000 Pounds To Provide A Service Men's Center — WPB Commends Successful Drive — Paper Milk Carton Case Delayed.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., February 21, 1944—Sixty two thousand five hundred bundles of waste paper, each bundle containing 80 pounds, have been sold at fifty cents a hundred to provide Chicago's Service Men's center with $25,000 as the result of the city wide curb pick-up of waste paper during the last month. The drive is considered a success by waste paper executives in this area who, last week, were warmly complimented by the War Production Board for their efforts and for setting a pattern which is being followed in other cities.

Ickes Given Sales Manager Post

George C. Ickes, Jr., has formally been given the title of sales manager of the Pilcher Hamilton Company, Chicago coarse paper jobbers. Mr. Ickes has acted in that capacity during the time that Henry W. Borchardt, then sales manager, was critically ill and he has continued to serve in that respect since Mr. Borchardt's death over a month ago. Mr. Ickes has been identified with the Pilcher Hamilton organization over fifteen years.

Browning Addresses Chicago Group

Brigadier General Albert J. Browning, former president of the United Wallpaper Company of Chicago and Joliet, came back to Chicago this week to address the Economic Club of Chicago and to "make good" on the prophesies of local leaders in the industry that he would go to the top as director of the Army's purchases division. General Browning who, in less than five years has risen from first lieutenant to his present rank, stated that the Purchases Division has, in the last two years, reduced costs of material an average of 20% and has saved the American people more than $9,000,000,000. His company, incidentally, is now almost entirely given over to the making of war goods.

Action on Paper Cartons Delayed

Objections of two aldermen of Chicago's city council this week deferred a vote in the city countcil on an ordinance amendment permitting the use of paper cartons for milk in this area. It was commonly expected that the ordinance would pass and thus end, once and for all, the years of litigation surrounding the use of such cartons. However, several aldermen asked for more time to study the ordinance and Alderman Gillespie, chairman of the health committee of the council, which had okayed the amendment, agreed to the delay. At a public hearing only one objection was raised, that coming from a small milk distributor who said the paper containers increased his costs by about half a cent a quart. The injunction under which milk now is being distributed in paper containers will continue in effect until the Illinois Supreme court disposes of a petition for a rehearing of its decision that a paper container is not a standard milk bottle as specified in the city code.

Swigart Accepts New Line Jobs

John D. Swigart, civic minded and energetic head of the Swigart Paper Company, well known Chicago paper jobbers, has recently been elected treasurer of the Chicago Crime Commission which has, for its purpose, a continual study of crime matters in this area as they directly affect the political and civic groups of Chicago. The Commission is, at the present time, vigorously investigating an alleged relationship between politics and criminal activities and has recommended a divorcing of the police department from the city's politics to prevent any possibility of alliances between the two.

Lake States Discusses Pulp Yields

The February meeting of the Lake States Section of TAPPI was held Tuesday, February 8, at the Conway Hotel, Appleton, Wis. The speaker was George H. McGregor, senior chemical engineer of the Forest Products Laboratory of Madison, Wis., who was assisted by Wm. W. Morris, Forester for the State of Wisconsin, U. S. Department of Agriculture. The subject was "Forest Lands in Wisconsin and Pulp Yields."

Mr. McGregor first outlined the potential wood supply of Wisconsin and how this should affect research and development in regard to what kinds of woods will be economically practical to use in the future. The cooking of mixed species together was discussed in light of the chemical composition of the various hardwoods and softwoods. The speaker then discussed pulp yields and how they could be increased in the various operations, such as Wood Preparation, Cooking and Bleaching. Mr. Morris followed Mr. McGregor with some pertinent facts about the woodlands of Wisconsin, after which a lively discussion took place.

Among those present were: A. W. Ayles, F. J. Allard, F. L. Aldrich, W. Andre, L. H. Andrews, A. Beaman, P. Boronow, M. F. Bretl, R. Brenzel, L. J. Broehm, A. H. Bunks, W. C. Christinsen, H. A. Chuse, C. Cook, H. C. Crandall, H. J. Desotell, R. C. Dosen, C. L. Durkee, G. F. Enderlein, J. Fike, L. E. Fitzgerald, L. V. Forman, J. Francort, N. Frewlund, L. A. Gilbertson, T. M. Gillespie, J. P. Gerhauser, J. H. Graff, C. Van Hammond, J. A. Handeyside, F. Hanson, T. A. Howells, P. J. Janquit, W. A. Johnson, A. B. Kaplan, E. H. Liethin, N. L. Malcove, A. E. May, G. H. McGregor, W. W. Morris, C. Nystrom, R. Oberle, P. A. Paulson, D. C. Porter, T. R. Probst, R. M. Radsch, E. W. Rasmussen, R. Risely, F. W. Sanders, E. R. Schafer, R. J. Seidl, H. W. Sherman, J. M. Shodron, R. G. Smith, C. E. Smith, J. Stark, R. A. Stillings, T. W. Toovey, V. H. Truesdale, E. V. Ullmann, M. W. Van de Laarschot, W. J. Van de Laarschot, R. W. Van Kirk, W. H. Verhagen, H. L. Voss, J. P. Weidner, S. D. Wells, P. H. West, and J. C. Woolwage.

Obituary

William C. Nash

William C. Nash, 81, the originator of many paper manufacturing improvements, died at St. Elizabeth hospital, Appleton, Wis., February 9 after a long illness. He lived at Neenah, Wis.

Mr. Nash assisted his son, the late William M. Nash, in developing the William C. Nash & Sons Company, Menasha, Wis., to promote research and development of patents related to the paper industry. He is credited with being the originator and perfector of the rag content papers of the Gilbert Paper Company, Menasha, where he was employed from 1892 to 1911.

Born October 10, 1862 at Fort Union, Ohio, Mr. Nash started his career in 1878 in Franklin, Ohio, working in the rag room at 75 cents per day, and later as a back tender on a paper machine at $1 per day for 12 hours' work. While working for the Mead Paper Company in Ohio in 1890, he was offered employment with the Gilbert Paper Company at Menasha. He remained there but a short time, then worked at the Park Mill at Marinette, Wis., and the George A. Whiting Paper Company, Menasha, Wis. In 1892 he returned to the Gilbert mill and remained there until 1911.

With the aid of L. T. Jourdain, Mr. Nash founded the Lakeside Paper Company at Neenah in 1911 (now the Lakeview mill of Kimberly-Clark Corporation) and operated it until 1921. Two years later he started up the Telulah mill for the Fox River Company, Appleton, Wis. He left there in 1925 to devote five years to the perfection of his wire, wet felt and dryer felt guides for paper machines.

In 1930 Mr. Nash assisted the Seaman Paper Company in the development of its insulation product known as Seapak, remaining with them until 1933. For the next five years he gave attention to the perfection of his guides.

It was in 1900 that Mr. Nash perfected the single palm tender which made possible the present wide deck machine. In the same year he perfected the first encased vacuum roll, the forerunner of the recently issued patent covering the original principle. He also developed the original impression watermark, perfected a centrifugal dirt remover and patented 36 other improvements in papermaking and machinery applicable to it.

Survivors are one son, Roy A. Nash and one daughter, Mrs. James Jones, both of Neenah.

Funeral services were held Saturday morning, February 12, at St. Margaret Mary Catholic church at Neenah, with the Rev. Joseph J. Glueckstein in charge. Burial was made in the parish cemetery.

James H. MacMahon

James H. MacMahon, 83, pioneer in introducing the use of American-made bleaching powder and, later, liquid chlorine, in paper pulp bleaching, died at his home in Buffalo, N. Y., on February 7. He was intimately connected with the early development of chemical manufacturing in the United States, was widely known in the paper and other chemical-consuming industries, and for nearly 40 years was connected with The Mathieson Alkali Works.

Mr. MacMahon was born in New York City in 1860, but spent most of his early life in England, first in Liverpool and later in Widnes, the English alkali manufacturing center, where he received a valuable chemical education. His career in industry began with the position of chemist at the DeSota Chemical Works at Widnes, where he eventually became works manager. He later held a similar position with the Cheshire Alkali Company, which operated an ammonia-soda plant at Middlewich, Cheshire.

In 1897, at the suggestion of an associate, Hamilton Y. Castner, inventor of the Castner electrolytic cell for the production of caustic soda and chlorine, Mr. MacMahon returned to the United States and became associated with the Castner Electrolytic Alkali Company, a subsidiary of the Mathieson Alkali Works. The company was then completing the installation of an electrolytic plant at Niagara Falls and Mr. MacMahon was given the responsibility of standardizing the manufacturing operations in connection with this pioneer venture.

At that time the chlorine produced in the electrolytic cells was used in the manufacture of bleaching powder, the first to be made commercially in this country. Practically all of the bleach used in the United States had previously been imported from England and considerable pioneer work had to be done to convince users that the new domestic product was superior to the imported material. Besides carrying on his managerial duties, Mr. MacMahon played an active part in gaining acceptance for the American-made bleach. Some years later, with the development of facilities for the liquefying of chlorine gas and for its safe transportation in liquid form, Mr. MacMahon was active in the field, particularly among the paper mills, in assisting consumers in the conversion from bleaching powder to liquid chlorine.

In 1918, Mr. MacMahon was made manager of the Mathieson plant at Saltville, Va., where soda ash, caustic soda and bicarbonate of soda are produced by the ammonia-soda process. He held this post until 1921, when he was made technical representative of the company with headquarters at Niagara Falls, and was placed in charge of development work. He remained with the company in this capacity until his retirement from active service in 1935.

Known affectionately as "Uncle Jimmy" among his associates and many friends in industry, Mr. MacMahon was universally loved and respected by all who knew him. His death marks the passing not only of a great pioneer in the American chemical industry but of a great and beloved human being.

Willis H. Loomis

GOUVERNEUR, N. Y., February 21, 1944—Willis H. Loomis, aged 73, long a leader in business, social and civic life here, one of the North Country's foremost industrialists and owner of extensive talc, mineral and farm properties in the southern section of St. Lawrence county, passed away at the Christian Science Benevolent Association, Brookline, a suburb of Boston, Mass., Saturday afternoon, February 12.

He was the organizer and president of the W. H. Loomis Talc Corporation of Gouverneur, with offices on Main street here, and mines and mills in Fowler.

Born October 17, 1870, in Paine's Hollow, Herkimer county, Mr. Loomis was a son of Chester and Lydia Esther (Norton) Loomis. Of the ninth generation of Loomis' in America he was descended from Joseph Loomis, a pioneer who landed at the port of

Boston, Mass., in July, 1638, from London and was with the horse troops in King Phillip's war. Mr. Loomis was also in direct line with the Revolutionary war, as his great-great-grandfather, Simon Loomis was at Burgoyne's surrender and was the scout who bore the news to General Washington.

After attending school at Paine's Hollow, Mr. Loomis entered Cornell university, where he was graduated in 1894.

Mr. Loomis had served as president of the W. H. Loomis Talc corporation since 1918, and of the St. Lawrence Ore company since 1920. Since 1928, he had been a director of the Green Hill Mining company. From 1928 to 1933 he was vice president of the Watertown Milling company.

The W. H. Loomis Talc corporation was organized in 1919. The company purchased the Arnold Mine and constructed its first mill at Emeryville. Mr. Loomis conceived the idea of a much finer product to reduce production costs for manufacturers and also the idea of double air flotation, for greater fineness and uniformity.

Many valuable mineral rights were acquired in southern St. Lawrence county. A second mill of greater capacity was built in 1922 at Popple Hill, Fowler, to meet increased demands for the product. A third mill was built recently and put into operation near the second mill.

The company owns four mines, the Arnold, Woodcock, Ontario and Johnson, and 12 farms on the various mineral properties.

Emil Charles Gildenzopf

YORK, Pa., February 21, 1944—Emil Charles Gildenzopf, died on February 10, at Wisconsin Rapids, Wis. He was 67 years old. Gil was superintendent of the Schmidt & Ault Paper Company from April 1932 to April 1943, when he was retired and moved to Wisconsin. His wife, Emma C. Gildenzopf, preceded him in death on July 15, 1933. Gil was buried in Prospect Hill Cemetery, York, Pa., on February 15, 1944.

Mr. Gildenzopf was a member of Fulton lodge, F. & A. M., Fulton, N. Y.: Howell Chapter 199, York; Gethsemane Commandry 75, York, and Harrisburg Consistery, Zembo Temple, A.A.O.N.M.S., Harrisburg.

Gil was the superintendent of Continental Paper Company at Ridgefield Park, N. J. from 1930 to 1932. He was superintendent of the Congoleum-Nairn, Inc. plant at Cedarhurst, Md., from 1918 to 1930. He was a member of the American Paper and Pulp Association and was Chairman of the New Jersey-Pennsylvania Division at one time.

Value of Reforestation Realized

F. G. Wilson of the Wisconsin Conservation Commission points out that the public is now beginning to realize the wisdom of several decades of reforestation, because the county, state and federal owned forests have been opened up to selective cutting, and attractive cash income is being realized. Last year the volume of saw-logs increased from 1,500,000 to 1,915,000 feet. The harvest of pulpwood, while it dwindled last year because of labor shortage, will be increased considerably this year, Mr. Wilson believes. Planting of trees by mechanical means gives promise of immense expansion of reforestation in the post-war years.

State College of Forestry Meets

The annual luncheon of the New York State College of Forestry was held at the Hotel Commodore in New York City during the week of the TAPPI Convention. It was the largest meeting to date, sixty being present.

After G. W. Sisson, Jr., one of the trustees of the college, spoke briefly, Dean S. N. Spring outlined the plans for the further expansion which will be necessary if the college is to accomplish the research and educational work now developing. Professor Libby added a few comments on the present activities of the Pulp and Paper Department.

The following were present: A. H. Anderson '31, F. E. Bahrenburg '30, J. C. Barthel '33, R. T. Bingham '33, M. E. Blew '29, Lt. J. O. Boesinger (Army) '40, E. F. Boyle '37, W. J. Bull '37, L. K. Burnett '29, Lt. (Jg) R. A. Campbell (Navy) '32, J. C. Casey '37, W. F. Connolly '35, T. M. Cook '35, R. F. Cuyle '34, R. T. DePan '40, W. P. Dohne '36, C. P. Donofrio '39 S. K. Dowst '38, I. Earle '34, G. A. Farrah '36, W. B. Groff '40, G. B. Hanneman '39, W. O. Hisey '28, L. Justice '31, B. L. Kassing '23, E. O. Knapp '30, M. J. Landberge '33, E. R. Lang '36, B. D. Levine '42, D. Loetscher '40, E. P. McGinn '31, W. B. Morehouse '34, F. W. O'Neil '33, D. D. Page '36, N. R. Phillips '41, M. Plunguian '30, W. F. Reynolds '39, C. M. Rhodes '28, J. H. Rich '32, L. E. Russell '38, H. M. Schulman '32, R. C. Shearer '33, R. H. Stevens '23, C. E. Shook '40, L. B. Taylor '33, L. B. Tucker '28, C. L. Van Schaick '28, R. C. Vokes '38, C. G. Weber '16, H. E. Weston '19, E. Winne '23, A. J. Wirpsa '37, and V. Woodside '28.

Pasqualucci-Libertine Nuptials

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., February 21, 1944—Miss Therese Louise Pasqualucci, daughter of Mr. and Mrs. Louis Pasqualucci, of Quincy, Mass., on February 5 became the happy bride of Steven Robert Libertine, USA, son of Mr. and Mrs. Angelo Libertine of Quincy. Angelo Libertine is one of the partners of the Hub Folding Box Company, Boston. The ceremony took place at a nuptial mass at St. John's Church, Quincy. The bride was given in marriage by her father. Miss Florence Libertine, the groom's sister, was maid of honor. The couple are living in Nevada, following a wedding trip to Las Vegas, Nev., where the bridegroom is stationed. The bride attended Thayer Academy, Jeanne d'Arc Academy and was graduated from the Hickox Secretarial School. Mr. Libertine was graduated from Thayer Academy and attended Harvard College before entering the Army.

C. B. Allen in Reliance Detroit Office

The transfer of C. B. Allen from Washington to the Detroit District of the Reliance Electric & Engineering Company, Cleveland, as an application engineer is announced by James W. Corey, sales vice president.

A graduate of M. I. T. in 1929, Mr. Allen was for some time connected with the Philadelphia and Boston Districts of Reliance. He takes up his Detroit duties following completion of an assignment with the Bureau of Ships, Navy Department, in Washington, for which Reliance had lent his services.

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Starts Used Machinery Division

The Harris-Seybold-Potter Company announces the establishment of a used machinery division under the management of Ren R. Perry. Headquarters of the division are at 343 South Dearborn Street, Chicago, Illinois. Used presses will be rebuilt in Chicago under factory supervision by experienced press craftsmen.

Within the limitations of government regulations, Harris is instituting its Used Machinery Division, so that a limited amount of rebuilding of good press equipment may be undertaken. In instances where presses are not being used most effectively, the Harris

REN R. PERRY

Used Machinery Division will serve as a clearing house to transfer such equipment to points of maximum usage. This type of service is a tangible contribution to the war effort.

Mr. Perry was formerly associated with Harris for many years in New York, New England, and in the Chicago territory. For several years past, he operated the Ren R. Perry, Inc. in Chicago which handled used press equipment. He is well acquainted with this market and is thoroughly conversant with the offset lithographic industry and the extensive activities of the Harris Company.

Form Iroquois Board Mills, Inc.

A & P Corrugated Box Corporation of Lowell, Mass., and Gibraltar Corrugated Paper Company, Inc., of North Bergen, N. J., have formed Iroquois Board Mills, Inc. This corporation will operate the paper mill at Thomson, N. Y., formerly owned by A & P Corrugated Box Corporation and operated as the Iroquois Mill Division.

The new corporation was organized under the laws of the State of New York as of February 1, 1944, and has its office and principal place of business at Thomson, N. Y.

The officers and directors of the new corporation are comprised of officers and executives of Gibraltar Corrugated Paper Company, Inc., and A & P Corrugated Box Corporation. H. L. Joachim, who has operated the Iroquois Mill since its acquisition by A & P last year, continues as vice president and general manager of the new corporation.

Committee Reports on Pulpwood

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., Feb. 23, 1944—The final report of the Combined Pulp and Paper Committee has been submitted to the Combined Production and Resources Board and the Combined Raw Materials Board, it was announced today.

On October 8, 1943, the committee issued a preliminary report outlining the supply situation in the pulp and paper industry. At that time the committee pointed out that prompt action would be required to increase the labor supply in the cutting of pulpwood, if serious deficits in supply were to be averted. The current report represents a summation of the facts covering pulpwood, pulp and paper products, and presents estimated combined requirements and supply as projected for 1944.

The committee finds that the combined requirements in 1944 for pulp and paper products of the United States, Canada and the United Kingdom (and including Newfoundland which furnishes additional supplies), are estimated to be equivalent to 23,597,000 cords of pulpwood. The combined supply estimate now stands at 20,956,000 cords, indicating an overall deficit of 11%. In the preliminary report issued in October, the prospective shortage was estimated at 27% and the improvement shown by current estimates is encouraging. This improvement is due in part to a further paring of requirements in the United States and Canada, coinciding with the issuance of further restrictions on consumption rates.

The combined 1944 supply estimate, of 20,956,000 cords, which includes further available inventories, is made up as follows by country of origin: Canada, 8,660,000 cords; Newfoundland, 444,000; and United States, 11,852,000. Current measures taken to increase pulpwood supply, significant as they have been, are not yet sufficient to bring this supply in balance with the combined requirements estimate of 23,597,000 cords. Either additional pulpwood must be produced, and that means additional manpower must be provided, or the estimate of 1944 requirements for pulp, paper and paper products will not be met.

Mills Cooperate on Chart Paper

The reception by the Franklin Research Company, Paper Division, during the recent TAPPI convention was well attended by representatives of the United States Navy, Hydrographic Office and Government Printing Office. Also present were executives of paper mills and their technical staffs, all directly interested in the Franklin Research type of high grade technical chart paper. Over 5,000,000 pounds of 50% rag nautical chart paper has been delivered so far to the U. S. Hydrographic Office.

W. H. Grohmann, who developed the nautical chart paper in cooperation with the engineering department of the U. S. Navy and Hydrographic Office, stated that all of this special paper delivered has been perfect and up to specifications, without a single complaint and all shipments, packed in cases or on skids, have arrived on time and in perfect condition.

All this is attributed to the splendid and unselfish cooperation of the men in the paper industry. The paper mills who have contributed are the Valley Paper Co., the Whiting Paper Co., the Byron Weston Co., Whiting & Co., and the Parsons Paper Co.

The Coast and Geodetic Survey, Naval Communication and Bureau of Ships orders for 50% nautical chart paper, are not included in the foregoing figures.

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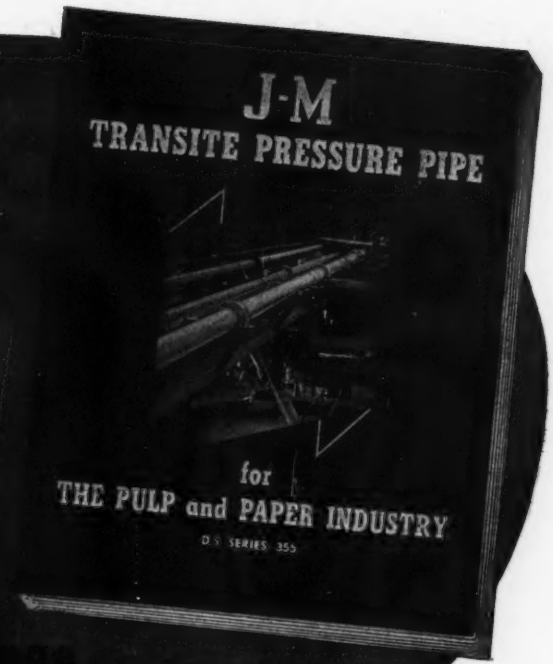

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- Photographs of typical installations.

MANY pulp and paper mills both in the United States and Canada have for years been consistent users of Johns-Manville Transite Pressure Pipe in their plants. As a service to these mills and to new users, Johns-Manville has compiled a manual based on its past experience with hundreds of above-ground installations in pulp and paper mills.

This 128-page manual is fully illustrated with many photographs, detailed drawings and diagrams of assembly and installation. It contains complete reference tables of accessories. It also contains a long list of mills that have installed Transite Pressure Pipe, giving name, location and the amount and type of pipe used.

Send for your copy today. There's no obligation. Ask for Installation Manual DS Series 355. And if you want information on underground use of Transite Pipe for water or sewer systems, ask for Pressure Pipe Brochure TR-11A or Gravity Sewer Pipe Brochure TR-21A. Address Johns-Manville, 22 East 40th Street, New York 16, New York.

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FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending February 19, 1944

STOCKS

	High	Low	Last
A. P. W.	2¼	2⅛	2⅛
Armstrong Cork Co.	38	37⅛	37⅛
Celotex Corp.	11⅜	11⅛	11⅛
Celotex Corp., pf.	18	17⅝	17⅝
Certain-Teed Products Corp.	6	5⅝	6
Certain-Teed Products Corp., pf.	61½	60¾	61
Champion Paper & Fibre Co.	26¼	26	26
Champion Paper & Fibre Co., pf.	112	111½	111⅞
Congoleum Nairn Co.	23½	23	23⅛
Container Corp. of America	20⅜	20	20⅛
Continental-Diamond Fibre Co.	11⅜	11⅛	11⅛
Crown-Zellerbach Co.	16⅜	15⅞	16⅛
Crown-Zelelrbach Co., pf.	99½	98⅝	98¾
Dixie Cup Co.	16½	16	16½
Dixie Cup Co. A	44⅞	44½	44¾
Flintkote Co.	20⅜	19½	20
Flintkote Co., pf.	105¾	105¾	105¾
Robert Gair	3⅜	3	3⅛
Robert Gair, pf.	14⅞	14½	14½
International Paper Co.	14½	13⅞	13⅞
International Paper Co., pf.	68½	66	68½
Johns-Manville Corp.	88½	84¾	87½
Johns-Manville Corp., pf.	130	121¾	121¾
Kimberly-Clark Corp.	32¾	32¼	32¼
Mac Andrews & Forbes	27	27	27
Mac Andrews & Forbes, pf.	135½	135¼	135½
Masonite Corp.	41¾	39	39½
Mead Corp.	8⅛	8⅛	8⅛
Mead Corp., pf. A—6%	86	86	86
Mead Corp., pf. B—5½%	76	75½	75¾
National Container Corp.	13¼	12¾	12¾
Paraffin Companies, Inc.	46	45	45¾
Paraffine Companies, Inc. pf.	....	....	....
Rayonier, Inc.	13½	12¾	12⅞
Rayonier, Inc., pf.	29¼	28¾	28¾
Ruberoid Co.	28⅞	28	28⅞
Scott Paper Co.	42⅞	42	42
Scott Paper Co., pf.	109	109	109
Sutherland Paper Co.	30	30	30
Union Bag & Paper Corp.	10	9½	9⅝
United Paperboard Co.	4⅜	4	4⅛
U. S. Gypsum Co.	71¾	70¾	70¾
U. S. Gypsum Co., pf.	175½	175½	175½
West Virginia Pulp & Paper Co.	18½	18⅛	18⅛
West Virginia Pulp & Paper Co., pf.	105	103¾	105

BONDS

Abitibi Pulp & Paper Co., 5s '53	73¼	73	73
Celotex Corp. 3¾s '55	....	....	....
Certain-Teed Products Corp. 5½s '48	101½	101	101½
Champion Paper & Fibre Co. 4¾s '50	....	....	....
International Paper Co. 6s '55	108	107¾	107¾
International Paper Co. 5s '47	104⅞	104½	104½
Mead Corp. 3½s '53	....	....	....
West Virginia Pulp & Paper Co. 3s '54	....	....	....

New York Curb Exchange

High, Low and Last for Week Ending February 19, 1944

STOCKS

	High	Low	Last
Great Northern Paper Co.	33	32½	32½
Hummel-Ross Fibre Corp.	5⅜	4½	5⅛
St. Regis Paper Co.	5	4½	4⅞
St. Regis Paper Co., pf.	152	150	152
Taggart Corp.	5¼	5¼	5¼

BONDS

American Writing Paper Co. 6s '61	100½	100	100½

St. Lawrence Corp. Nets 98 Cents

The annual report of the St. Lawrence Corporation of Montreal, shows that the revenue from its investment in the Brompton Pulp and Paper Company was $298,273 after expenses plus interest on bank loan, balance available for A stock was $282,144, or 98c a share, this falling short of the year's $1 dividend on the A. by $6,049, which reduced surplus to $19,-221.

During the year the Corporation increased its holdings of St. Lawrence Paper Mills common stock by 362 shares and those of Brompton Pulp & Paper common by 22 shares. The bank loan was slightly increased during the year, from $312,340 to $318,414.

Argues Abitibi Bond Holders Rights

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., February 21, 1944—The legal position of the bondholders of Abitibi Power and Paper Company with respect to their claims for interest on interest was recently explained by an eminent Toronto corporation lawyer, Mr. A. G. Plaxton. Mr. Plaxton points out that the provisions of the indenture and mortgage securing the bonds, while not very clear on this particular point, do indicate that the bondholders are legally entitled to the compounded interest.

The Royal Commission appointed by the Ontario government in 1940 definitely recognized the right of the bondholders to interest on interest, but more recently, it is understood, the Ontario Government Abitibi Committee, takes the opposite view.

It is now argued that it would be unconscionable to treat the bondholders in any way different from the way in which they would have been treated had the claim proceeded to judgment and foreclosure when interest would have been allowed at the rate of 5% per annum on both the principal and overdue interest found due them.

It is quite possible, however, for the sake of reaching an amicable settlement between all parties interested in this important company, that the bondholders may be willing to accept stock, either preferred or common, for the unpaid "interest on interest."

Lake St. John Co. Makes Good Report

The report of the Lake St. John Power and Paper Company, of Dolbeau, Que., shows subtantially improved operating and net profits, an increase of over $500,000 in net working capital together with a reduction of some $200,000 in aggregate of bond and debenture indebtedness. Net profit of $185,987 was the best since 1937. The balance sheet shows cash and government bonds aggregating $841,000, against $499,000 a year ago. With total current assets up from $3,189,000 to $3,470,000, and total current liabilities down from $628,000 to $397,000, there was an increase in net working capital from $2,560,000 to $3,073,000. Current assets figure is exclusive of $1,-032,000 in Hearst notes.

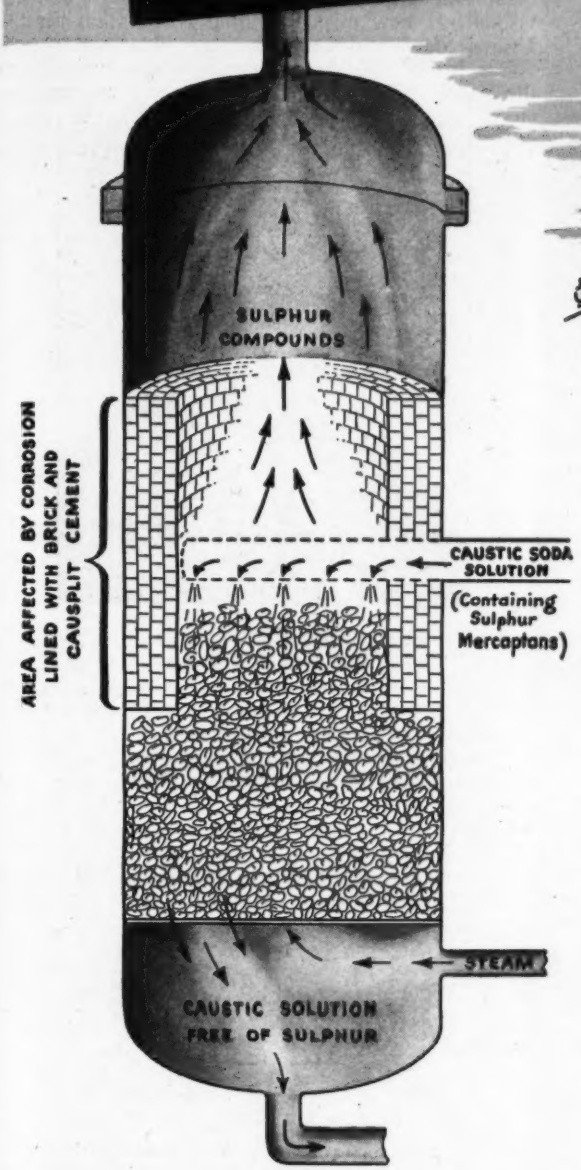
Pulpwood requirements for the mill, barring untoward incidents, should be adequately covered, states A. Stewart McNichols, president.

Union Bag Reports $1,058,476

The preliminary report of the Union Bag and Paper Corporation for 1943, shows a profit for the eleventh consecutive year. However, owing to wartime handicaps, an increase in sales failed to produce a corresponding gain in net, according to Alexander Calder, president.

Net income, for the year ended on December 31, was $1,058,476, after all charges, including $1,708,-724 for income and excess profits taxes, or 83 cents a share on the outstanding capital stock. In the preceding year net earnings amounted to $1,890,401,

When repairs call for ACTION --depend on PENNSALT CAUSPLIT CEMENT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(Containing Sulphur Mercaptans)
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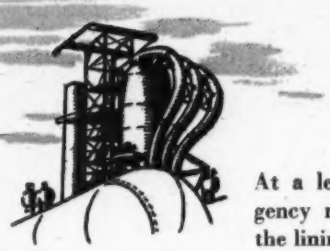

At a leading oil refinery emergency repairs were required on the lining of a Mercaptan Tower . . . because of sulphur erosion at the intake area. The engineers in charge thought they were faced with a three-day shut-down for repairs, with the resultant loss of production.

A Penn Salt technician was called in and after going over the situation he recommended Causplit Cement in conjunction with corrosion-resistant brick. He gave installation instructions and four courses of the brick were used with Causplit Cement as the bonding material throughout. Drying was speeded by heating the tower to 100 degrees F. *and the equipment was back in service the next day!*

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equal to $1.50 a share, after taxes of $1,565,643. Sales in the respective years were $33,554,955 and $27,915,174.

The company has received a statement from the War Department's Price Adjustment Board that no excess profit was realized by the corporation in 1942. In view of this, Mr. Calder believes that any renegotiation of last year's contracts will have no material effect on earnings as reported after a provision for all taxes and reserves.

Brompton Co. Nets $1 a Share

In the annual report of the Brompton Pulp and Paper Co. of Bromptonville, Que., Arthur F. White, president, says huge quantities of pulpwood continue to be exported to United States mills from areas in which for years Brompton has secured its supply, and consequently it has been necessary to obtain substantial quantities of pulpwood from remote areas at a very high delivered cost. Operating income for 1943 was $740,434, as compared with $1,339,780 for 1942. Net profit was $300,859, as compared with $541,740 in 1942, or at the rate of $1 per share as compared with $1.80 in the year previous.

St. Lawrence Paper Mills Earns Less

The statement for 1943 of the St. Lawrence Paper Mills, of Montreal shows a net profit of $506,432, as compared with $514,998 in 1942, while further general improvement in the company's balance sheet position is reflected in an expansion of nearly half a million in working capital combined with further reduction of $556,000 par value of the company's preferred shares, the latter bringing to $1,225,600 the amount of preferred retired during the past four years. The balance sheet shows cash and Government bonds aggregating $1,637,000, as compared with $1,419,000 a year ago, this alone being equivalent to nearly 2½ times total current liabilities of $688,000. Net working capital at $4,207,000 compared with $3,732,000 a year ago, $1,424,000 at the end of 1939.

U. S. Gypsum Co. Makes Good Report

United States Gypsum Comapny reports net income of $5,038,450, equal to $3.75 a common share, for 1943, compared with net income of $5,652,316, equal to $4.27 a common share in 1942.

The company's current assets as of December 31, 1943 were $44,900,861 and current liabilities were $9,868,660. A year previous current assets totaled $42,659,989 and current liabilities $10,889,146.

Sewell L. Avery, president, said, "present building activity is greatly restricted by government controls, and the future trend is dependent upon factors that are not predictable. A substantial backlog of needed residential construction is undoubtedly being created, but the extent of its realization will be influenced by postwar economic and political considerations."

Oxford Profits Up

The Oxford Paper Company and its wholly owned subsidiaries, manufacturers of fine grade papers, reported last week earnings of $838,000 for 1943 after all charges, taxes and a special reserve for post-war adjustments of $75,000.

J. F. Rhoades Joins Johnson & Wierk

John F. Rhoades, chief engineer of the Mead Corporation, Chillicothe, Ohio, for the past 23 years, has recently joined Johnson & Wierk, Inc., consulting engineers for the pulp and paper industry, at 415 Lexington avenue, New York 17, N. Y.

In 1919, Mr. Rhoades joined the Management Engineering and Development Company at Dayton, Ohio, when it was founded. As chief engineer of the Mead Corporation his activities embraced the construction of several large pulp and paper mills and allied developments now owned by that corporation, in the United States and Canada.

His broad experience now becomes available to the paper industry for the design and construction

JOHN F. RHOADES

supervision of pulp and paper mills, steam and power generating stations, and plants allied to the paper industry.

Johnson & Wierk, Inc., was organized in 1929 as consulting engineers, specializing in the pulp and paper industry. The most recent project handled by this firm was the mill for Industrias Klabin do Parana, of Sao Paulo, Brazil. This mill, at Monte Alegre, when complete, will annually produce 48,000 tons of newsprint, 40,000 tons of bleached and unbleached sulphite pulp, and 30,000 tons of groundwood.

During the present war period Johnson & Wierk, Inc., has been occupied with work allied to the war effort in the design of metallurgical plants, steam plants, and the design and development of special machines.

Goes With Arkell & Smiths

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., February 14, 1944—Clarence W. Harvey, assistant treasurer of Munro & Church, box board dealers, has resigned, as of February 11, to become sales representative in the New England territory for Arkell & Smiths, paper bag manufacturers, Canojaharie, N. Y., with headquarters in the Statler Building.

Mr. Harvey's son-in-law, Bromby S. Westlake, Second Lieutenant in the U. S. Army, who was reported missing in a raid over Germany, January 4, is now reported a prisoner of war.

Finds No Gain in 30 Pound Newsprint

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., February 21, 1944—In a special report issued by the Newsprint Association of Canada, the question is analyzed as to whether or not any advantage would result from reducing the standard weight of newsprint paper from 32 to 30 lbs. a ream. The association's production committee has been investigating this matter, and the committee's findings are that in terms of total supply the result would be a loss of both tons and yards, with higher prices per ton and inferior quality of paper.

The committee admits that newsprint of 30-lb. weight gives about 6⅔ more yards per ton than the 32-lb. weight, but says machine capacity drops with any reduction of basis weight. Experience shows, it adds, that a change from 32 to 30 lb. brings an average loss of about 11% in tons per hour and, consequently, a net loss of 4⅓% in yards per hour. On machines already running full time, a change to 30-lb. paper means a clear loss of supply, both in tons and in yards.

Answering the question as to whether there are other machines available to make up for the above loss, the committee says a considerable part of Canadian capacity is not available for present newsprint production, due to lack of wood or lack of power, or because machines are making other essential products.

Michigan Div. Meets

[FROM OUR REGULAR CORRESPONDENT]

KALAMAZOO, Mich., February 21, 1944—The February meeting of the Michigan Division of the American Pulp and Paper Mill Superintendents Association was held at the Park-American Hotel Thursday evening of last week. Inclement weather held down the attendance but those present enjoyed an interesting talk delivered by W. G. Etter, personnel director of the River Raisin Paper Company at Monroe. His topic was Safety and included descriptions of machine guards, education of the personnel in safety practices and a discussion of the Michigan compensation laws. Preceding the address the usual routine business of the meeting was transacted.

The following members and guests attended: Ralph Atkins, Lee Paper Company; Willard Barnhard, Arthur Hanson, Walter Harwick, H. W. Hartman and M. Nossaman, American Box Board Company; C. A. Braginton and J. A. Dean, Michigan Paper Company; Harry C. Bradford, A. W. Cole, Henry Nendorf and Joe Waber, Rex Paper Company; John DeVries and P. H. Gideon, Bryant Paper Company; A. G. Dries, Hercules Powder Company; W. G. Etter, River Raisin Paper Company; C. V. Gallagher, Monroe, Mich.; Carl Hoelderle, Anheuser Busch Company; R. A. Lane, Charles Rader, Glen Sutton, Arnold Weller, F. Weirich, John Worst and M. C. Zusir, Sutherland Paper Company; Lloyd Lynn, Kalamazoo Machine and Tool Company; Leo Marlow and L. H. Mimms, Kalamazoo Paper Company; J. W. McClaren, National Starch Products; Don E. McDowell, Kalamazoo Vegetable Parchment Company; H. C. Pearson, Pioneer Paper Stock Company; E. R. Vanatta and Melvin Vanatta, Western Board and Paper Company and Homer E. Stafford.

To Be Asst. Manager

Allis-Chalmers Manufacturing Company, Milwaukee, Wis., announces the appointment of A. D. Robertson as assistant manager of the motor division at its Norwood works, Norwood, Ohio. This plant manufactures all but the larger sizes of Allis-Chalmers motors.

Mr. Robertson was transferred from the company's electrical department in Milwaukee, where he had been in charge of the marine section. Prior to this, he served as a sales engineer in the Allis-Chalmers Washington, D. C., office. He came to Allis-Chalmers with a degree in electrical engineering from North Carolina State College, completing the company's graduate training course at its Pittsburgh works.

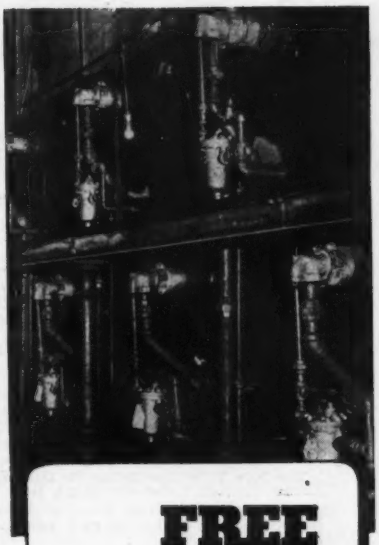
He is a member of the AIEE and the Engineers Society of Milwaukee.

Restrict Paper Towels

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 21, 1944 — The War Production Board today announced the reduction of the 1944 manufacture of paper towels permitted for home use from 100 to 80 per cent of the 1942 base period output. This was effected by amending General Conservation Order M-241-a. Shortages of pulp and the desire to shunt more of this material into industrial towel production are responsible for the change.

Several other minor changes have been made in the order also, but these are merely for the purpose of clarification.



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—38.5% FUEL SAVING, by more efficient condensate drainage with Armstrong traps.

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—72.5% LESS MAINTENANCE. The Armstrong inverted bucket design, with patented free-floating valve, is immune to ordinary dirt troubles, has self-scrubbing action, and eliminates wire-drawing in the valve seat.

Armstrong equipment for paper mill service includes standard traps, special traps for paper machine dryer, service, compound traps for digesters, evaporators, etc., and forged steel traps for high pressure steam. Write for literature, or call your Armstrong distributor.

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STEAM TRAPS — HUMIDIFIERS

PAPER
TRADE JOURNAL
Title Reg. U. S. Pat. Off.
Henry J. Berger
EDITOR

Vol. 118 February 24, 1944 No. 8

COMING EVENTS IN PAPER INDUSTRY

AMERICAN PAPER AND PULP ASSOCIATION, Sixty-seventh Annual Convention and meeting, Waldorf-Astoria Hotel, New York, February 14-18.

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, Convention, Commodore Hotel, New York, February 14-17.

NATIONAL PAPER TRADE ASSOCIATION OF THE UNITED STATES, Convention, Waldorf-Astoria Hotel, New York, February 14-17.

THE NEW YORK ASSOCIATION OF DEALERS IN PAPER MILLS' SUPPLIES, Annual Banquet, Commodore Hotel, New York, Tuesday, February 15.

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

CHICAGO PROFESSIONAL PAPER GROUP—First Monday of each month except July and August at Chicago, Ill.

CURE FOR "FEDERALITIS"

The remarkable expansion of the payrolls of the Federal Government is one of the conspicuous features of, and to some critics a significant trend in the Roosevelt New Deal Administration. In its rapid growth it is a factual rival to the phenomenal upward spiral of Jack's legendary beanstalk. As there was no denying the progress of the fabled bean plant, there appears to be an insatiable urge back of the opening of new agencies and other administrative offices. With this steady centralization going on, the Administration is proceeding farther and farther from a Jefferson type of Democracy toward a highly complicated and costly system of bureaucracy.

Discussing the subject of government in the last issue of *The Tax Front*, published by The Tax Foundation, 30 Rockefeller plaza, New York, Hatton W. Sumners, Democratic Congressman from Texas, says in part: "More and more in later years we have been engaged in the perfectly silly undertaking of trying to make this Federal organization function as the general governmental agency of all the people. As a result, we have built up at Washington a governmental Colossus utterly beyond human comprehension or democratic control, regardless of which party or group of officials is in power. By the nature of that sort of government, it is inevitable there shall be extravagance, wastefulness, tyranny. It is inevitable that there shall be more and more government by directives issued by appointed, not elected, personnel working without supervision. We have all but reduced the States to the status of governmental vassals. We have gone further, and largely dissolved the States by attaching their subdivisions directly to the Federal Treasury through loans and grants. We have made the individual citizens and the business in these States subject to Federal control by the creation of financial dependence upon the Federal Treasury."

Continuing, Congressman Sumners points out that, "Money which we thought we were getting for nothing we realize now was got by mortgaging the tax-paying power of unborn generations, while at the same time that tax-paying power was also mortgaged to get money to pay the salary and expenses of the vast army of administrators, directors and bosses. We are now in the initial stages of what will prove to be another of the great battles between concentrated power and democratic government. In this struggle the States must regain control over their sources of revenue which the Federal Government has tapped and is using to subjugate the States and their subdivisions by loans and grants from the Federal Treasury. The States must reassert and re-establish their sovereignty as responsible agents of general government. They must do this not only in order to preserve democratic control in the matters of general government, but in order that the governmental business of the Federal organization may be freed of the business which belongs to the States. That would bring the total of its business within the comprehension of the elected representatives, so that Federal Laws may be enacted by the Congress instead of being enacted as 'directives' by an appointed bureaucratic personnel."

Commenting on the trend toward undemocratic government, Congressman Sumners declared: "Fortunately for us, the States are not too large for democratic control. They function in the main through smaller units of government. Their chief officers are chosen by the people. They afford the opportunity and provide the machinery for the operation and development of democratic institutions, and the development of the governmental capacity of the people, who are the governors in a democracy. The Magna Carta, the Petition of Rights and our own Declaration of Independence mark the great epochs in democratic governmental history because their effect was to decentralize governmental power and move it back toward the people. On the other hand, no great monument can be found along the road which Democracy has traveled, marking the place where governmental power and responsibility have been moved away from the people, out of the units of government which they can control, toward a central governmental agency. Such a direction of movement is not progress in a democracy. No period of concentration of governmental power, of bureaucratic development, of government by edict instead of

government by laws, will ever be cited by the historians of the future as a time of democratic progress."

In concluding Congressman Sumners states: "Our ancestors fired shots which were heard around the world. Their duty was to establish democratic government. It is ours to preserve it. Great is our responsibility and opportunity. While our boys are fighting on the battle fields of the world, we must with equal courage, equal patriotism, and equal sacrifice if necessary reestablish and have for them when they come home, those who do, a democracy worthy of their service and sacrifice. A nation of people bottle-fed and rocked to sleep in the arms of a great Federal bureaucracy cannot do the job."

Mills Elect Bargaining Agencies

APPLETON, Wis., February 21, 1944—The Paper Mill Workers Union, an independent organization, remains the collective bargaining agency for employees of the Kimberly-Clark Corporation's mill at Niagara, Wis. This was the result of secret balloting conducted February 8, in which the union received 272 votes out of 441 ballots cast. This was 62 per cent, with more than 50 per cent being required. CIO received 109 and two AFL unions a combined vote of 59.

Workers of the Riverside Paper Corporation, Appleton, Wis., will hold an election soon to determine their bargaining agency. The election was ordered by the National Labor Relations Board after a hearing December 20, requested by District 50, United Mine Workers of America. The election must be held within thirty days of February 4. AFL unions did not send representatives to the hearing.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1944		Corresponding Weeks—1943	
January 8	91.7	January 9	85.7
January 15	91.2	January 16	88.1
January 22	89.2	January 23	87.9
January 29	89.2	January 30	87.1
February 5	90.9	February 6	87.2
February 12	*89.6*	February 13	88.4

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1943	87.2	88.9	89.5	88.7	91.4	84.8	84.3
1944	*90.1*	...	...	...	...	...	...

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1943	91.0	88.3	89.6	89.6	82.2	87.8

COMPARATIVE YEARLY SUMMARIES

	1937	1938	1939	1940	1941	1942	1943	1944
Year to Date.	89.1	64.5	77.4	88.7	86.5	104.1	87.4	*90.2*
Year Average.	79.8	71.5	83.4	85.6	97.4	90.4	87.8	...

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS†

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1938	56	63	63	60	60	59	59	69	70	73	67	61	64
1939	65	73	76	74	69	73	68	77	82	91	88	77	77
1940	78	75	74	76	82	85	77	79	78	85	82	77	78
1941	81	88	89	89	91	94	92	98	95	99	98	90	92
1942	102	101	101	95	82	72	68	75	76	81	82	77	84
1943	86	88	94	94	96	94	89	96	94	94	93	87	93
1944	*90*	..	..	..	..	..	..	..	..	..	..	..	..

Week ending Jan. 8, 1944—86
Week ending Jan. 15, 1944—93
Week ending Jan. 22, 1944—93
Week ending Jan. 29, 1944—95
Week ending Feb. 5, 1944—97
Week ending Feb. 12, 1944—97

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

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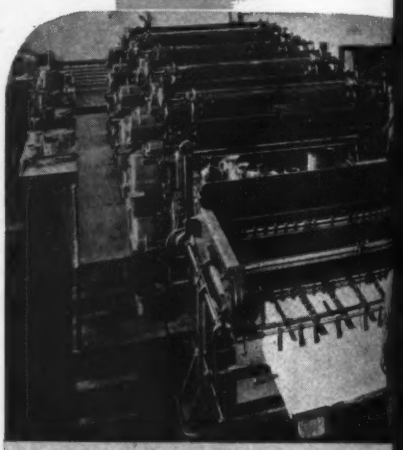
NEW CYANAMID *Paper Resin* IMPROVES WATER RESISTANCE

There has been a notable increase in the use of starch as an adhesive for coated printing papers and boards. However, a need for improved water resistance has been felt.

To solve this problem in the use of starch coated papers, Cyanamid's paper technicians have applied timely research to the use of starch as an adhesive for coated printing papers with the formulation so modified that the paper produced may be used for offset printing and have improved water and wet rub resistance. As a result, a successful new method has been developed involving the use of this resin together with a special plasticizer and dispersing agent which are added in proper proportion to the blended pigment and starch. The coating color is applied in the usual manner on standard paper coating equipment and under normal drying conditions. The coated paper can be printed immediately after calendering, although maximum wet rub resistance ordinarily will not develop until after several days.

Cyanamid's resin, which forms the basis of this water resistance treatment, is a water dispersible thermosetting type. Although the amount of resin required depends upon the degree of rub resistance desired, it is quite effective when used in minor proportion. By employing this Cyanamid-developed starch-resin coating, paper is produced which may be printed satisfactorily by either the offset or letterpress method with wet rub resistance appreciably improved and the curling tendency greatly reduced. These qualities make paper coated with this formulation particularly useful for tags, posters, labels, flour bags, wallpaper, boxes and containers.

Cyanamid will be glad to supply complete information on the use of this effective new coating resin for improving the water resistance of starch pigment paper coatings.



Coated papers should be made reliably water-resistant to withstand printing by the offset process (above) and pass critical inspection (below).

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122 E. 42nd St., New York 17, N. Y.
Edited by R. G. Macdonald, Secretary

Electronic Heating of Nonconductors*

By G. C. Nonken[1]

Abstract

The low rate of heat flow through nonconducting materials has been the limiting factor in many modern production lines where the heating of relatively thick nonmetallic materials is required. Of this large group of materials, the processing of plastics, wood, plywood, bonded paper, and similar fibrous materials has been particularly difficult because their outer surfaces cannot be heated too high without damaging the surfaces. However electronic heating can be employed in the processing of these materials and the varied factors are discussed.

Electronic heating produces heat directly in the material thereby heating electrical nonconductors at a uniform rate throughout the whole mass without heat transfer from an outside source of high temperature. It can be turned on or off instantaneously without the time lag or the overshoot of the typical heat exchanger and the rate of heating can be controlled accurately and automatically.

The electronic heating of electrical nonconductors is accomplished by applying a voltage at a frequency between 2,000,000 and 30,000,000 cycles per second to the material that is placed between the plates to which the voltage is directly applied. The heating is the result of the dielectric loss within the material and is measurable at as low a frequency as 60 cycles per second. However since the dielectric loss in most dielectrics increases nearly proportionately with an increase in frequency, the rate of heating at 6,000,000 cycles per second (6 megacycles) is roughly 100,000 times greater that at 60 cycles at the same voltage. The higher frequencies are used in industrial applications.

The use of electronic heating for nonconducting materials is not entirely new. Experimental work on the high-frequency heating of nonconductors started about fifteen years ago (*1*). Medical diathermy has been used by doctors for several years to heat parts of the body in the treatment of various disorders. In this instance as in the industrial applications, heat is induced in the electrical nonconductor placed between electrodes to which a high-frequency voltage is applied.

The electronic heating of nonconductors should not be confused with the electronic heating of metals (*2*) and other good electrical conductors. Metals are heated by placing the metal object in a high-frequency magnetic field. Eddy currents are set up in the metal and result in the dissipation of heat. The heating occurs in the surface of the metal part. Extensive use of this type of heating is being made where case hardening or other localized heating of metals is desired. The induction heating of metal billets for forging and the induction melting of metals are common practice. The power for heating or case hardening the larger pieces is usually supplied from rotating machines at frequencies below 11,000 cycles.

Electronic heating of conductors and of nonconductors have the following two characteristics in common: they both may use electronic oscillators for their power source and they both have heat dissipated directly within the material to be heated.

Equipment

Electronic heaters consist of high-frequency electronic tube oscillators which draw power from any standard alternating-current power source and convert this power into an alternating-current of several million cycles per second. A schematic diagram of a simple oscillator circuit is shown in Fig. 1.

Although the basic circuits and electronic tubes used in electronic heaters are quite similar to those used in radio broadcasting stations, the construction is a radical departure from radio practice. They are sturdily built and have complete electrical protection to withstand typical industrial usage. Electronic heaters of several sizes are built, completely enclosed in industrial cabinets, ready to be connected to the source of power and to the material to be heated.

Adaptation

The high-frequency power required to heat a specific material depends on the weight to be heated in a given time, the temperature rise necessary, and the specific heat of the material; i.e.,

$$KW = \frac{w.\ \Delta T.\ C\rho}{3415\ \Theta} \qquad (1)$$

where KW = kilowatt power dissipated in the load
w = pounds to be heated
Θ = time in hours to heat w pounds
ΔT = temperature rise in degrees F
$C\rho$ = specific heat of the material

The power dissipated in the material may be expressed as follows:

$$KW = \frac{2\pi \times f \times E^2 \times C \times PF}{1000} \qquad (2)$$

where KW = kilowatts power dissipated in the load
f = frequency of the applied voltage
E = voltage applied to the electrodes
C = the electrostatic capacity of the load
PF = the power factor of the material of the load

* Presented at the Army and Navy Requirements Conference of the Technical Association of the Pulp and Paper Industry, Palmer House, Chicago, Ill., Sept. 21-24, 1943.

[1] Works Laboratory, General Electric Company, Pittsfield, Mass.

Obviously, since these two equations each represent the power absorbed by the load, they are equal to each other. These are the fundamental equations which are used to predict the size and type of equipment needed in new applications.

Theoretical considerations indicate that all solid and liquid nonmetallic materials can be heated in a high-frequency electrical field. Practical considerations which determine the usefulness of the electronic heating of nonconductors involve details of the electrical and physical character of the material as well as the economic factors, such as processing time, utilization of processing equipment, labor, and cost of power. Each different application of electronic heating to nonmetallic materials requires a certain amount of engineering to insure power application of the equipment. The application engineer must know all of the quantities in Equation 1 and the values of C and PF in Equation 2 in order to determine the proper equipment. There is a degree of variation possible in the frequency and voltage for a particular job. It is evident that, for a given heating rate and material, the product of $E^2 \times f$ equals a constant. There is an upper limit for a particular job to the values of the voltage (E) and the frequency (f). The maximum limit to the voltage is the voltage at which an electrical breakdown occurs in the material being heated or in the air around the edge of the material. The maximum value of frequency cannot be quite so clearly defined, but the limiting factors will be mentioned. The frequency of oscillation depends, in the following manner, on the capacity of the load (C) and the inductance of the "tank coil" (L) in the oscillator. (Fig. 1)

$$f = \frac{1}{2\pi\sqrt{LC}} \qquad (3)$$

The smaller the values of L and C, the higher will be the frequency. The value of C is usually fixed by the size and shape and material to be heated. The larger the area heated and the thinner the material the higher will be the capacity. The limiting inductance L is dependent quite largely on the length of the leads from the electronic heater to the work. Only in the event that the leads are very short (a few feet) and the capacity (C) is small (below 50 mmf) do the characteristics of the electronic oscillator tubes become limiting factors to increasing frequency.

Manufacturing engineers have in recent years come to realize that the overall economy of many industrial heating processes depends more on the speed, the maximum output of the manpower and the associated equipment, and the quality of the product, than on the investment cost and power efficiency of the heater. However, one must not lose sight of these last two factors. The first cost of electronic heaters is relatively high. Their cost per kilowatt output is in the order of a hundred times the cost of a simple 1-kilowatt resistance heater and from two to ten times the cost of ovens and furnaces, per kilowatt of installed heater capacity. The efficiency of power conversion in an electronic heater is in the general order of 50%. In comparison with many heating processes this efficiency is high. For example, in the average industrial oven from 5 to 30% of the energy put in the oven actually goes to the heating of the load, and the rest is lost through the walls and doors. On the other hand other heating processes are practically 100% efficient, such as the heating of liquids by totally immersed electrical heaters. Electronic heating will increase the overall efficiency of many processes because of its unique feature of quickly and uniformally heating thick sections of nonconductors.

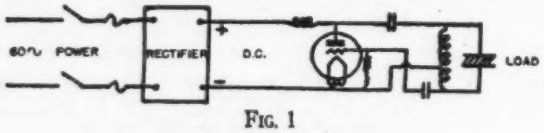

FIG. 1
Electronic Oscillator

Flat materials of uniform thickness are heated by placing electrodes in direct contact with two sides of the material and applying the high-frequency voltage between the two electrodes. Uniform heating will occur in the material if the material itself is homogenous. When the material is heated in a press the two platens may be used together as the grounded electrode, and a metal plate in the middle of the stack of insulating material is used as the other electrode. A piece of material of uniform thickness may also be heated uniformally if the electrodes are spaced away from the material by a uniform air gap. Uniform heating can be obtained, in some instances, even if the material or the air gap are not uniformly thick, or if the material is nonhomogenous. This is accomplished by varying the thickness of the air gap so that the proper heating is accomplished in all parts of the material.

Applications

High-frequency heating has been commercially applied to plywood bonding, to the laminating of other thick wooden structures, to the preheating of plastic preforms prior to molding, and to similar jobs where the material to be heated was thick and the time to heat was short.

It has been common practice to cold press plastic moulding materials into preformed shapes, to facilitate measuring and handling the uncured material. With thermosetting resins these preforms are put into the hot mold either at room temperature or heated slightly by a hot plate or other means. The compound is then put in the mold and the mold is closed under pressure. The compound is heated from the mold. In some molds part of the compound will cure and become hard before the compound in other parts of the mold is hot enough to flow. This condition results in parts of the mold not being filled properly.

Electronic heating is being used to heat the preformed plastic pieces to a curing temperature outside the mold. The preforms are then quickly put in the hot mold and pressed. The pieces of thermosetting plastics must be heated quickly (usually in a minute or less) in order that the resin will not have time to cure before it gets into the mold. This process causes much better flow of the compound since the compound is all hot and plastic, ready to flow as soon as the mold is closed. The electronic heating of preforms also shortens the molding time appreciably since the compound is not heated in the mold. The fact that the compound is soft when the mold is first closed in some instances makes it possible to mold in fragile inserts without distorting or breaking them.

The application of electronic heating to the heating of thick sections of resin bonded paper is particularly attractive. The present method of heating these bonded paper panels is by contact with the hot platens of a press. Thick plates must be left in the press several hours to insure that the temperature of the center of the plate reaches the curing temperature of the resin. Figure 2 shows a typical heating time curve

for plates made of kraft paper and a phenolic resin bonded between the hot platens of a press. These same laminated plates could be heated uniformally throughout their thickness in less than 5 minutes with electronic heating. From this curve it appears questionable as to whether any advantage can be shown in using electronic heating on panels less than ¼ inch thick unless greater utilization of the press can be made by stacking a number of thin plates together between platens and heating them with electronic heating. The advantage of electronic heating for thick sections is very apparent. For example; a 2 inch thick section can be heated throughout in 5 minutes with electronic heating while 2.5 hours are required to bring the same piece up to a uniform temperature when heated from press platens.

Data have been obtained on the use of the electronic heating of thermosetting resin-bonded paper plate stock during the curing process. Table I gives the power factor of two phenolic bonded laminated materials and one uncured material at different frequencies and temperatures. The power factors of these materials do not change much between room temperature and 100° C at 25 megacycles. This means that the heating rate is only slightly higher as the temperature increases. Likewise the power factor of the uncured material is not appreciably higher than that of the cured material.

TABLE I.—POWER FACTOR OF BONDED KRAFT PAPER LAMINATED BOARD

	Power Factor		
	25 MC		3 MC
Material	25° C.	100° C.	25° C.
Dry process phenolic cured.....	.037	.051	.03
Dry process phenolic uncured.....	.042	.058	..
Wet process phenolic cured.....	.06	.058	.041

Pieces of cured phenolic-bonded laminated paper were heated with an electronic heater in the laboratory. All of the unknown parameters in Equations 1 and 2 were measured: the weight, temperature rise, and time of heating for Equation 1; and the frequency, voltage, capacity, and power factor for Equation 2. The difference in the value of power as shown by these two equations was not over 20%. This indicates the overall accuracy with which such measurements can be made. The error involved incomplete data on the variation of specific heat and power factor with temperature. Also the heat lost due to convection and radiation was not accounted for; calculations indicate that this heat loss amounted to about 2% of the total power dissipated in the sample. About 1.5 kilowatts of high-frequency power must be dissipated in each pound of phenolic-bonded paper in order to heat it to 130° C in 1 minute. Likewise 0.3 kilowatt per pound is required to heat it in 5 minutes and 0.1 kilowatt in 15 minutes. In practice, the use of an electronic heater with 15 kilowatt output will easily double the output of a 24-inch square, five opening steam press.

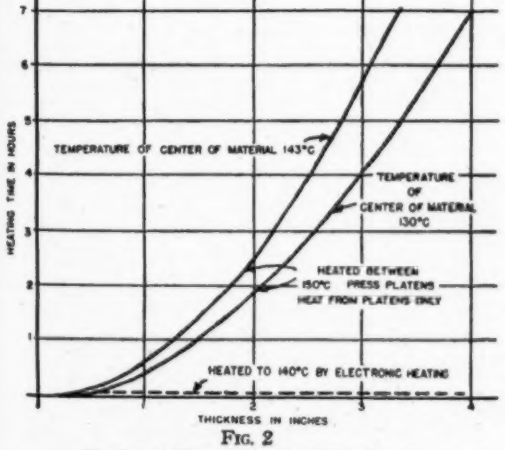
HEATING TIME IN HOURS
THICKNESS IN INCHES
TEMPERATURE OF CENTER OF MATERIAL 143°C
TEMPERATURE OF CENTER OF MATERIAL 130°C
HEATED BETWEEN 150°C PRESS PLATENS HEAT FROM PLATENS ONLY
HEATED TO 140°C BY ELECTRONIC HEATING

FIG. 2

Heating of Phenolic Laminated Paperboard

Good as electronic heating may be, it is obvious that it cannot practically be applied to all heating problems. Therefore, each application should be made to stand on its own merits. For example, the problem of the drying of wet paper on a paper machine is one in which electronic heating may not be essentially better than the present method of heating by contact with hot rolls. The paper is sufficiently thin so that very little temperature gradient exists through its thickness. Drying processes require free air circulation over the surface of the piece to be dried. This constitutes a serious problem in drying paper by electronic heating where plates are necessary on each side of the paper and must be quite close to the paper in order to induce sufficient heat in the paper to evaporate the water. It is evident, that at present this is not a natural application of electronic heating; however, further developments may make it practical.

Literature Cited

1. DeWalt, K. C., *Electronics*, (November 1932) Page 338.
2. Jordan, J. P., "Application of Vacuum-tube Oscillators to Inductive and Dielectric Heating in industry." Transactions of the AIEE, Vol. 61, 1942.

TAPPI Notes

Harvey P. Cannon has returned to the Mutual Box Board Company as superintendent after having served for some time in the Civil Air Patrol, Rehobeth, Md.

Wayne M. Schragg, recently of the New York State College of Forestry, is now with the Hercules Powder Company, Parlin, N. J.

C. E. Hartford and Malcolm Taylor have been advanced to the positions of Assistant General Superintendent and Technical Director at the Savannah, Ga., mill of the Union Bag and Paper Company.

The Glens Falls Chapter, Empire State Section, TAPPI met on February 11 at the Queensbury Hotel, Glens Falls, N. Y. About 40 attended in spite of a raging blizzard. W. K. Metcalf of the J. O. Ross Engineering Company talked on "The Use of Air in Paper Mills." The next meeting will be held at Glens Falls on March 10th Dwight Jones of E. D. Jones & Sons Company will talk on "Stock Preparation."

The TAPPI Delaware Valley Section met at the Engineers Club on Friday evening, February 11. Robert B. Wolf, manager of the Pulp Division of the Weyerhaeuser Timber Company discussed the new log barking system at Longview, Wash., and showed the film depicting this barker.

Send Cigarettes To Service Men

Construction and maintenance employees of the sulphite plant of the Thilmany Pulp and Paper Company, Kaukauna, Wis., are hurrying 40,000 cigarettes to be sent to service men in the Pacific war theater. They will be bought with $100 in prize money received by these workers in a safety contest.

The Action of Nitrogen Dioxide on Unbleached Pulp. Part I*

By George L. Clarke[1]

Abstract

In an attempt to replace chlorine entirely or partly by other bleaching agents, experiments were made on the effect of nitrogen dioxide upon unbleached pulp. When liquid nitrogen dioxide was introduced into an aqueous pulp suspension and the mixture heated for 1 to 1.5 hours at about 90° C., the lignin constituent of the unbleached pulp was so changed that it could be removed by hot caustic extraction. Since nitrogen dioxide in the presence of water is converted into a mixture of nitrous and nitric acids, the delignification cannot be carried to completion without considerable damage to the cellulosic constituent, which limits the use of nitrogen dioxide to the first stage of bleaching, comparable with the chlorination stage. After extraction with a small amount of hot sodium hydroxide solution, the partly bleached pulp may be bleached to the desired color with alkali hypochlorite. If the brightness is limited to 70 to 75, a considerable amount of chlorine bleaching agents may be replaced by nitrogen dioxide. Pulp bleached in this manner had physical properties which were not very different from those bleached by the chlorine-hypochlorite method with cold caustic extraction between the stages. Likewise, the alpha-cellulose content of the two pulps was about the same, but the viscosity was lower for the nitrogen dioxide-bleached pulp, probably as a result of the action of the nitrous and nitric acids formed. The indications were that the combined action of these two acids is responsible for the bleaching effect. It is suggested that the reaction comprises two phases, the first of which consists of the nitration of the lignin residue and the second of the oxidation of the nitrolignin, the latter phase resulting in the solubilization of the modified lignin. The nitrogen content of the treated pulp and the results of experiments with mixtures of sodium nitrite and nitric acid and with nitrogen dioxide and nitric acid seem to support this hypothesis.

This study was undertaken when the revived interest in the pulping of wood, etc., with nitric acid and the oxides of nitrogen, as revealed in numerous publications and patents, suggested the idea of utilizing these chemicals for the bleaching of pulp. The pulping effect of these compounds is a result of one or more complex reactions between them and the lignin constituent, the latter being converted into a form which is soluble in dilute aqueous alkali, by means of which it may be separated from the fibers. A similar effect could be anticipated to take place with the ligneous residue in unbleached pulps as prepared by the usual pulping methods.

The publication of this study at the present time would seem to be appropriate in view of the shortage of chlorine and chlorine compounds and, although of a more or less preliminary character, it is hoped that it may arouse some interest in connection with attempts to substitute other bleaching agents for chlorine.

Of the various oxides of nitrogen, nitrous oxide (N_2O) was found to have no effect on unbleached pulp; this could be expected because this gas, although easily soluble in water, is almost inert under ordinary conditions; only at rather high temperatures does it decompose into nitrogen and oxygen. Nitric oxide (NO) is only sparingly soluble in water; owing to the ease with which it combines with oxygen of the air, any oxidizing effect observed in using nitric oxide results from the presence of nitrogen dioxide (NO_2) or nitrogen tetraoxide (N_2O_4). Thus, the chances were that, of the three oxides mentioned, nitrogen dioxide would be the only one suitable for delignification of pulp.*

With one exception, the literature apparently contains no reference to the use of nitrogen dioxide or, for that matter, of the other oxides for the bleaching of wood pulp. The exception is an attempt to utilize a mixture of nitrogen oxides and ozone (as produced by means of an electric arc), an attempt which, however, does not seem to have been successful. (*1*).

Nitrogen dioxide is a gas above a temperature of 21.6° C.—i.e., it may be liquefied by cooling below this point. The nitrogen dioxide used in the present experiments was first prepared in the laboratory by known methods; later a commercial product, available in steel cylinders from du Pont de Nemours and Company, Wilmington, Delaware, was employed.

Behavior of Nitrogen Dioxide Toward Cellulose and Lignin

Liquid nitrogen dioxide dissolves cellulose (in the form of cotton linters and wood pulp) within a few minutes. No ballooning was observed under the microscope. On evaporation of the nitrogen dioxide from a layer of the solution on a glass plate, a film of regenerated cellulose is obtained which, however, is rather brittle. The cellulose may be regenerated as a precipitate by adding petroleum ether to the solution. It is probable that a number of the hydroxyl groups in cellulose are oxidized by the action of the liquid nitrogen dioxide, resulting in the formation of oxycellulose with carboxyl groups in the 6-position of the glucose residues, comparable with the preparation described by Yackel and Kenyon (*2*). Some of the hydroxyl groups may also be converted into nitrate groups. Even wood meal dissolves in liquid nitrogen dioxide after a short time.

When nitrogen dioxide is introduced into a suspension of unbleached pulp, the latter acquires almost

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* Presented by title at the Army and Navy Requirements Conference of the Technical Association of the Pulp and Paper Industry, Palmer House, Chicago, Ill., Sept. 21-24, 1943.

A portion of a thesis submitted in partial fulfillment of the requirements of The Institute of Paper Chemistry for the degree of Doctor of Philosophy from Lawrence College, Appleton, Wis., 1939. Carried out under the direction of E. Heuser.

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* Preliminary experiments were made prior to 1939 under the direction of E. Heuser by E. Howard in the Research Department of the Canadian International Paper Co., Hawkesbury, Ontario, Canada.

at once a brown color, indicating that a reaction has taken place. The brown material [obviously chiefly the lignin constituent of the pulp (modified by the action of the nitrogen dioxide) or its conversion products] is sparingly soluble in water. In dilute alkali, such as aqueous sodium hydroxide, it dissolves to a greater extent, but it is not completely soluble even at elevated temperatures. Sulphur dioxide changes the brown color of the treated pulp to a bright yellow; however, on washing with dilute sodium hydroxide solution, the yellow color turns into an orange shade. A similar phenomenon was observed when the brown pulp material was treated with dilute inorganic acids or oxalic acid; it became light-yellow in color but changed immediately to a dark brown on washing with dilute alkali. This behavior suggests that, under the influence of nitrogen dioxide, some organic matter is changed so that it acts as an indicator.

The intensity of the brown color of unbleached pulps resulting from the treatment with nitrogen dioxide varies with their bleachability. With partly bleached (chlorinated) pulp, the differences are greater than those produced by chlorination alone and permit them to be used as a more accurate measure of the bleach requirement in the stage following chlorination. The color differences may be expressed by reflectance values (brightness) as obtained with the General Electric recording spectrophotometer. That these values may be used as a measurement of bleachability is seen from a comparison of the reflectance values with the permanganate numbers of a series of samples which had been obtained by chlorinating portions of an unbleached pulp with increasing amounts of chlorine. These samples, after extraction with 1% sodium hydroxide solution at 80° C. for 0.5 hour, were suspended in water to give a 3% consistency. An excess of nitrogen dioxide gas was then introduced into the suspension and the mixture was allowed to stand for 1 minute at room temperature. The pulp suspensions were then filtered on a Büchner funnel, washed with water and dilute ammonia solution (in order to eliminate color changes caused by varying acidity), and finally again with water. The pulp samples thus obtained in the form of thin pads were pressed, dried on a metal surface drier, and tested. The data are shown in Table I.

TABLE I.—RELATION BETWEEN REFLECTANCE VALUES AND PERMANGANATE FIGURES OF CHLORINATED AND SUBSEQUENTLY NO_2-TREATED PULP SAMPLES

Chlorine Added, %	Permanganate Number	Reflectance at 460 mmu
0.75	5.9	31.0
1.50	4.5	39.0
2.25	2.2	44.2
3.00	0.9	53.7
3.75	0.5	59.5
4.50	0.3	63.0

It will be noted that the differences in reflectance are still relatively large when the permanganate numbers are lowest. Once the relationship between the reflectance values of the partly bleached pulp and the bleach necessary to obtain the desired final brightness in the second state has been statistically established for one type of pulp, the determination of the reflectance values of the partly bleached sample would suffice to supply the desired information.

Bleaching with Nitrogen Dioxide

As mentioned above, the lignin present in unbleached pulp is attacked by the nitrogen dioxide in a way which renders it only partly soluble in cold but soluble to a greater extent in hot dilute aqueous alkali. Thus, the pulp is delignified and its permanganate number decreases. However, the delignification cannot be carried to completion without considerable damage to the cellulose component, as will be seen later. Hence, if nitrogen dioxide is to be used as a bleaching agent, one can hope to use it only for accomplishing a partial bleaching effect, in much the same way as chlorine is employed in a first-stage (chlorination) bleaching.

To insure any substantial degree of delignification, the temperature has to be relatively high. In fact, it was only when the temperature of a 3% pulp suspension was raised to about 90° C. that the permanganate figure decreased to an extent which would reduce the amount of bleach to be used in the second stage to a reasonable value. The time necessary to accomplish this objective was 1 to 1.5 hours. The quantity of nitrogen dioxide used in the earlier experiments was relatively high, varying from 3 to 4% on the dry weight of the pulp. Later, it was found that this quantity could be reduced to 2.35%, and indications are that it may be reduced still further. Some data on the effect of time upon the degree of delignification of the treated pulp before alkaline extraction are shown in Table II. The temperature varied between 92 and 93° C. A Mitscherlich sulphite pulp was used which had a permanganate number of 14.9 (corresponding to a total chlorine demand of 5.3%).

TABLE II.—EFFECT OF TIME OF TREATMENT OF UNBLEACHED PULP WITH NITROGEN DIOXIDE UPON DEGREE OF DELIGNIFICATION

Time, hr.	0	1	1.5	2.0	2.5	3.0	3.5
Permanganate no.	14.9	7.3	6.7	5.5	4.8	4.9	4.9

It is seen from these figures that the greatest reduction occurred after 1 hour and that further reduction took place at a relatively slow rate. Thus, not much would be gained by extending the time over 1 to 1.5 hours, especially because the permanganate number, as obtained after washing with water, may be decreased by two to three additional points by hot alkaline extraction.

To obtain an approximate idea of the alkali demand, pulp bleached in the first stage with nitrogen dioxide, as described, was extracted at 90°C. and a consistency of 7% for 30 minutes with varying amounts of aqueous sodium hydroxide. By observing the degree of brightness obtainable by the action of a limited amount of calcium hypochlorite on the extracted and well-washed pulps, the efficiency of the alkali treatment could be shown. With a limited after-bleaching procedure, brightness spreads would be expected to be more pronounced.

Table III shows that about 0.5 to 1% sodium hydroxide, calculated on the moisture-free (extracted) pulp at 90° C. for 30 minutes should suffice to reduce the final bleach demand to a relatively low figure. Later, it was found that lengthening the time to 1 hour permitted a reduction of the temperature to 50 to 55° C.

TABLE III.—EFFECT OF VARYING AMOUNTS OF CAUSTIC SODA IN THE EXTRACTION OF NO_2-TREATED PULP

NaOH (on the moisture-free pulp), %	Brightness of Partially After-Bleached Pulps
0	53.2
0.25	54.5
0.50	58.5
1.00	59.5
2.00	61.7

In the earlier attempts to bleach the nitrogen dioxide- and alkaline-treated pulps to the desired color in a second stage with calcium hypochlorite,

rather large amounts of hypochlorite were required to reach brightness values of 80 and higher. Under such conditions, the total saving of chlorine by replacing part of it with nitrogen dioxide was rather limited. Later experiments revealed that brightness values from 70 to 75 could be obtained with 2 to 3.5% calcium hypochlorite. Thus, for bleaching a Mitscherlich sulphite pulp, having a permanganate number of 15.7, only 1 to 1.5% chlorine were required, the rest of the bleaching agent being nitrogen dioxide (2.4%), followed by washing with sodium hydroxide (0.5 to 1%). To impart to the same pulp the same degree of brightness by bleaching with chlorine in the first stage and with calcium hypochlorite in the second (with cold caustic extraction between the stages), a total chlorine consumption of about 4% would be required. Therefore, by using nitrogen dioxide in the first stage, followed by hot alkaline extraction, 2.5% of chlorine (or 62% of the total of 4%) could be replaced. The saving would be less, of course, if a brightness of 80 or more were required.

The physical properties of an easy bleaching western hemlock pulp, bleached with nitrogen dioxide in the first and calcium hypochlorite in the second stage to a brightness of 80, were somewhat lower than those obtained with the same pulp bleached to the same brightness by the customary two-stage chlorination-hypochlorite method. However, the differences, except for the fold values, were not great, as may be seen from Table IV.

TABLE IV.—PHYSICAL PROPERTIES OF PULP BLEACHER IN FIRST STAGE WITH NITROGEN DIOXIDE (I) AND WITH CHLORINE (II) AND AFTER-BLEACHED WITH CALCIUM HYPOCHLORITE

Beating time (pebble mill), min.		0	30	60	90
Basis weight (25x40—500)	I	56.5	55.5	56.9	55.7
	II	53.2	55.5	56.5	53.3
Apparent density	I	9.7	10.7	11.6	11.8
	II	10.3	10.9	11.6	11.7
Bursting strength	I	43	60	79	79
	II	55	66	79	84
Tear factor	I	2.09	1.74	1.46	1.41
	II	2.35	1.93	1.63	1.52
Fold, M.I.T.	I	21.0	112	452	442
	II	41.0	133	566	914
Opacity, TAPPI	I	78	76	71	69
	II	78	76	72	67
Freeness, S.R.	I	800	772	708	634
	II	783	780	715	610

There was also little difference in the alpha-cellulose content of the two pulps, the pulp bleached with nitrogen dioxide in the first stage having a slightly higher value (85.5 and 85.0%, respectively). These figures are rather low and are probably explained by the unusually high pentosan content of this type of pulp. With a differently cooked pulp, alpha-cellulose contents of between 87 and 88 should result from either of the two bleaching methods.

The only pronounced difference was in the viscosities of the two pulps, that of the nitrogen dioxide-bleached pulp being considerably lower than that of the chlorine-bleached material. The values were 39 and 67 centipoises (determined by the TAPPI method). The lower viscosity indicates that the cellulose has suffered more degradation during bleaching with nitrogen dioxide than when bleached in the customary way. The explanation is simple: The nitrogen dioxide, when introduced into a 3% aqueous pulp suspension, is converted into nitrous and nitric acids:

$$2\ NO_2 + H_2O = HNO_2 + HNO_3.$$

Both these acids exert a hydrolyzing effect upon the cellulose. Considering the rather severe conditions of temperature and time (90° C. for 1.5 to 2.0 hours), it is surprising that the cellulose was not degraded to a greater extent than that shown by the drop in viscosity from 67 to 39. On the other hand, if ways and means could be found to decrease the temperature as well as the time (possibly by the use of certain catalysts), less degradation should occur. The results obtained thus far seem to indicate that, by the application of nitrogen dioxide bleaching to a properly cooked unbleached material, a bleached pulp could be produced particularly suitable for rayon manufacture and for certain other conversion purposes.

Action of Nitric and Nitrous Acids

The conversion of nitrogen dioxide into nitrous and nitric acids in the presence of water seems to indicate that it is the action of these two acids, rather than that of the nitrogen dioxide as such, which is responsible for the bleaching effect of the latter. In pursuing this line of thought, the question arose as to whether these two acids, as would be expected from their different oxygen content, would exert different effects. It was found that the bleaching effect of nitric acid alone is rather limited. Even as much as 9.34% nitric acid (calculated on the pulp), when allowed to react for 15 minutes at 95°C., showed very little bleaching effect since, after the usual hot alkaline extraction procedure and after-bleaching with 2.86% calcium hyprochlorite, the brightness of the resulting pulp was only 50.

The simplest way to study the action of nitrous acid alone appeared to be the use of a combination of sodium nitrite and hydrochloric acid. Schwalbe (*3*) used such a combination, with subsequent treatment with lime for the conversion of unbleached pulps into "cotton-like" materials, without, however, claiming any bleaching effect.

A quantity of 3% nitrous acid (as sodium nitrite) and the corresponding quantity of hydrochloric acid were allowed to act on unbleached Mitscherlich pulp (permanganate figure 14.9) for 30 minutes at a 2.8% pulp consistency at varying temperatures. The pulp samples were then extracted with sodium hydroxide solution as previously described.

From the experience with nitrogen dioxide, it would be anticipated that no pronounced effects would be observed at room temperature or a little above. The figures in Table V confirm this anticipation, a temperature as high as 90° C. being necessary for reducing the permanganate number of the unbleached pulp from 14.9 to 8.3 within 0.5 hour.

TABLE V.—EFFECT OF VARYING TEMPERATURE ON BLEACHING WITH NITROUS ACID

Temperature, °C.	Untreated	60	70	80	90
Permanganate no.	14.9	11.6	11.5	9.5	8.3

TABLE VI.—EFFECT OF VARYING QUANTITIES OF NITROUS ACID

Nitrous acid (on the pulp), %	0	1	2	3	4	5
Permanganate no.	14.9	10.9	9.9	8.3	7.8	8.0

The data in Table VI show that smaller quantities than 3% nitrous acid, even at this high temperature, exerted less effect, and quantities above 3% did not essentially change the previous results.

In comparing the effect of the two acids, it obviously is chiefly the nitrous acid which is responsible for the bleaching effect when nitrogen dioxide is brought into contact with an aqueous pulp suspension. On the other hand, it would appear probable that, in the combination of the two acids, the nitric acid also plays its part. Whereas the lignin in the unbleached pulp seemed to be quite resistant to nitric acid alone, it was thought that it might yield more easily to the

latter's oxidizing power if it had already been attacked by the nitrous acid.

Bleaching with Nitric Acid and Sodium Nitrite

Such conditions might possibly be created by using, instead of hydrochloric acid, an excess of nitric acid for the decomposition of the nitrite, a reaction which would proceed according to the following equation:

$$NaNO_2 + 2\ HNO_3 = NaNO_3 + HNO_2 + HNO_3.$$

The results of experiments carried out to test this point of view seem to confirm this supposition. To samples of the unbleached pulp, a certain quantity of sodium nitrite was added and the suspension heated to 95° C. Varying amounts of nitric acid were then added and the reaction was allowed to proceed for 15 minutes. After washing, alkaline extraction, and washing again, the samples were after-bleached with 2.86% calcium hypochlorite at room temperature and finally tested for brightness. The results are shown in Table VII.

TABLE VII.—BLEACHING WITH SODIUM NITRITE AND NITRIC ACID

Sample	$NaNO_2$ Added, %	HNO_3 Added, %	Brightness
1	2.34	1.87	65
2	2.34	5.61	80
3	2.34	9.34	83
4	0	9.34	50
5	2.34	Acetic acid*	52
6	2.34	Sulphuric acid*	57

* Equivalent amounts of these acids instead of nitric acid were added.

The beneficial effect of the nitric acid on the brightness of the bleached pulp is obvious; the latter increased with increasing amounts of nitric acid, whereas nitric acid alone had very little effect. On the other hand, when acetic or sulphuric acid in amounts equivalent to that of the sodium nitrite were added instead of nitric acid, the effects were distinctly inferior to that of the nitrite-nitric acid combination.

Although the conditions applied in these experiments are far from being within commercial limits, the results show that, in bleaching with nitrogen dioxide, each of the two acids resulting from the contact of the nitrogen dioxide with an aqueous pulp suspension, seems to play an essential part. Moreover, it is suggested that it is the nitrous acid which reacts first and that the modified lignin is more easily attacked by the nitric acid and becomes more readily soluble in dilute sodium hydroxide.

The function of the nitric acid in its combination with nitrous acid might be compared with the effect of excess chlorine on the lignin of pulp in the process of chlorination. It appears that only a small part of the total chlorine is consumed in the substitution of lignin hydrogen atoms; the greater part is probably used for oxidation of the chlorolignin, as a result of which the latter becomes soluble in water and dilute alkali (*4*).

This conclusion has been substantiated by an observation of Kress and Voigtman (*5*), who found that chlorolignin which had been prepared by introducing chlorine gas into a suspension of dry isolated lignin in dried carbon tetrachloride was insoluble in dilute alkali, much in contrast to the behavior of chlorolignin formed by the chlorination of wet pulp (*6*).

The greater stability to dilute hot caustic soda of chlorolignin formed under conditions in which the possibility of oxidation had been greatly diminished was demonstrated on the pulp itself. A sample of sulphite pulp (with a permanganate number of 10), dried over phosphorus pentoxide, was suspended in dried carbon tetrachloride, and chlorine gas in excess was introduced into the suspension. After removal of the unused chlorine and of the solvent, the pulp sample possessed a dark gray-brown color, similar to that of pulp which had been chlorinated in the presence of water. The treated sample was then extracted with 1% sodium hydroxide at 6% consistency for one hour at 100° C. However, in spite of this drastic treatment, the permanganate number of the extracted pulp had dropped to only 8.6. This reduction amounted to considerably less than that which is caused by the usual chlorination of wet pulp. It therefore would appear that it is not only an increase of the acidic character of the lignin (caused by the entrance of chlorine atoms into the lignin molecule) that is responsible for the solubility of the chlorolignin in water and alkali; a certain measure of oxidation seems to be necessary to ensure increased solubility.

In the search for evidence which would support the postulated parallelism between the function of excess chlorine in the chlorination of pulp and that of nitric acid in the treatment with a mixture of sodium nitrite and nitric acid, the question arose as to whether, in the latter case, substitution as the primary reaction would occur.

Freudenberg and Dürr (*7*) have shown that the action of nitrogen dioxide on lignin results in the substitution of a nitro group for hydrogen (or methoxyl), with the liberation of nitric oxide. The reaction may be illustrated thus:

$$RCH + 2\ NO_2 = RCNO_2 + HNO_2$$

That a similar reaction is, at least in part, involved when an aqueous suspension of unbleached pulp is treated with nitrogen dioxide is seen from the fact that pulp so treated contained an appreciable quantity of nitrogen. An aqueous suspension of unbleached pulp was treated with 3% nitrogen dioxide (calculated on the dry pulp) at 0° C. for 4 hours. The low temperature was chosen to reduce oxidation. After the treatment, the pulp sample was washed free of all acid, dried, and the nitrogen determined [according to the modified Kjeldahl method (*8*)]. An average value of 0.082% nitrogen was found. Values of a similar magnitude were obtained with other NO_2-treated samples (see Part II of this series).

The lignin content of the pulp, determined by the standard TAPPI method, showed an average value of 1.32%. Thus the nitrogen content, calculated on the lignin, was 6.2%. Assuming that a lignin unit has a molecular weight of 840, this value is in agreement with the assumption that four nitro groups have entered the lignin molecule (calculated nitrogen content, 6.1%).

The wash waters resulting from the treatment were nearly colorless, indicating that the nitrolignin compound was practically insoluble in water.

In another experiment, the amount of nitrogen dioxide consumed by the pulp was found to be 0.26, 0.26, and 0.33% of the weight of the pulp.* The nitrogen content of the pulp listed above, expressed as nitrogen dioxide was 0.27%. This agreement between bound and consumed nitrogen dioxide would suggest that, in the absence of an excess of nitric acid, the first phase of the reaction consists chiefly of nitration and, further, that the function of the excess nitric acid is to oxidize the nitrolignin in the second phase of the reaction and thus to increase its solubility in hot caustic soda solution.

Action of Nitric Acid and Nitrogen Dioxide

To test this hypothesis further, unbleached pulp was subjected to the action of a mixture of nitric acid and nitrogen dioxide at a temperature of 85° C. and 3% consistency. The concentration of the nitric acid was 3 grams per liter and the quantity of nitrogen dioxide amounted to 1% on the dry weight of the pulp. The pulp was unbleached western hemlock pulp, having a permanganate number of 8.9 and an alpha-cellulose content of 87.7%. Samples were removed at intervals, thoroughly washed with water, dried, and analyzed for permanganate number, alpha-cellulose, and copper number. The results are shown in Table VIII.

TABLE VIII.—ACTION OF NITRIC ACID-NITROGEN DIOXIDE ON UNBLEACHED PULP

Time, minutes	Permanganate Number	Alpha-Cellulose %	Copper Number
0	8.9	87.7	2.93
10	4.8	85.6	2.78
20	4.1	84.8	2.76
30	3.9	84.9	2.76
40	3.2	85.1	2.66
50	3.1	85.5	2.55

The data show a rather rapid action of the reagent mixture on the permanganate number; after as short a time as 10 minutes, it was reduced to about half its original value, after which it decreased only slowly. The alpha-cellulose content first dropped and then increased slightly, obviously resulting from an initial attack of the longer cellulose chains and a later and more rapid attack of the shorter chains. That the copper numbers showed no increase cannot be interpreted to mean that the pulp was not degraded. This is born out by the rather low viscosity of the completely bleached pulp (Table X). The decrease in the copper number with the time of treatment is probably a result of the oxidation of reducing to carboxyl groups. Attempts to limit degradation by using temperatures below 85° C. and nitric acid concentrations below 3% failed to produce a sufficient first-stage bleaching effect.

Another portion of the unbleached pulp was then subjected to the same treatment for 15 minutes. It was then washed, extracted with hot alkali (1% sodium hydroxide on the weight of the pulp, 1 hour at 6% consistency and 70° C.), washed, and after-bleached with 2.86% calcium hypochlorite and 6% consistency and 38° C. A pH slightly above 8.0 was maintained throughout the bleaching time of 4 hours, during which time the bleaching agent was exhausted. The bleached stock was finally treated with an aqueous solution of sulphur dioxide. The brightness of the finished pulp was 81 and the yield was 95.8% (calculated on the dry unbleached pulp).

TABLE IX.—EFFECT OF BLEACHING WITH NITRIC ACID-NITROGEN DIOXIDE AND CALCIUM HYPOCHLORITE

	Alpha-Cellulose %	Copper Number
Unbleached	87.7	3.14
After first stage	85.6	2.98
After caustic extraction	86.2	2.82
Completely bleached	85.6	2.35

The changes in alpha-cellulose content and copper number after each step are shown in Table IX.

The same unbleached pulp was subjected to the customary chlorination-hypochlorite bleaching process, 2.5% chlorine being used in the chlorination stage and 1% (as bleach powder) in the after-bleaching stage. The partly bleached pulp was extracted with 1% sodium hydroxide at 38° C. for 1 hour. The brightness of the completely bleached pulp was 80. Some chemical properties of the two pulps are listed in Table X.

TABLE X.—CHEMICAL PROPERTIES OF PULP BLEACHED WITH NITRIC ACID-NITROGEN DIOXIDE AND WITH CHLORINE IN THE FIRST STAGE

	Alpha-Cellulose, %	Copper Number	Pentosans, %	Cuprammonium Viscosity, centipoises
Chlorine-bleached	85.1	2.24	3.16	66.7
HNO_3+NO_2-bleached	85.6	2.35	3.26	30.1

As is seen from the data in Table X, the chemical properties of the two pulps are very similar, with the exception of the viscosity, which is only 30 for the nitric acid-nitrogen dioxide bleached pulp—i.e., about half that of the chlorine-bleached pulp. This decrease in viscosity was to be expected. It was also reflected in the physical properties of the pulp, the bursting strength being about 15%, the tear about 21%, and the fold about 9% below the values for the customary bleached material. The inferior physical strength properties and the lower viscosity would not be disadvantageous if the pulp were used for rayon manufacture and other conversion purposes. However, in this case an unbleached pulp would have to be used with an alpha-cellulose content of 87 to 88% or higher.

Although the greater bleaching efficiency of the nitric acid-nitrogen dioxide system, as compared with nitrogen dioxide, is obvious and seems to lend support to the hypothesis suggested above, neither system appears to be feasible as a commercial bleaching method in competition with chlorine-hypochlorite bleaching, unless the amounts of chemicals can be substantially reduced. It remains to be seen whether this may be accomplished by the use of catalysts in the nitrogen dioxide system or other more powerful and, at the same time, less degrading oxidizing agents than nitric acid in the combined system.

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New Percentages of Reserves

WASHINGTON, D. C., February 23, 1944—New percentages of reserves of production capacity and supplies have been fixed for manufacturers of paper and paperboard, the War Production Board announced today. These restrictions were set by Direction 2 to General Conservation Order M-241.

The direction requires that on and after March 1 each manufacturer shall reserve in each calendar month (in each mill) time and supplies sufficient to produce and deliver within the month the following percentages of the mill's finished production:

Paperboard	45 per cent
Condenser tissue	100 per cent
Paper	20 per cent

The previous percentages were: For paperboard, 35 per cent; for condenser tissue, 100 per cent, and for paper, 15 per cent.

* These amounts were determined by titration with alkali of (a) a solution of nitrogen dioxide in water and (b) the aqueous pulp suspension (into which nitrogen dioxide had been introduced) after 4 hours. The difference in the two titration values was assumed to be equivalent to the nitrogen dioxide which had been consumed in the reaction with the lignin of the pulp.

Experiences of a Paper Mill in Bacteriological Control*

By George M. Suydam[1] and Ruth R. McConky[2]

Abstract

A discussion of the means employed by one paper mill for the production of paper of low bacterial count is given as a possible aid to other mills desiring to institute bacteriological control. Data are given to show the effects of the various treatments which were tried. This investigation has shown that cleanliness throughout the mill, controlled break-point chlorination of the mill-filtered water, and white water chlorination on the paper machine are all necessary for optimum results as indicated by low bacterial counts of the finished paper.

In 1937, the increasing use of paper in the manufacture of food containers, and especially of milk bottles, raised the question of the bacterial condition of these papers. Investigation of this condition was started in our mills, with particular attention being paid to the one machine which produced the majority of these grades. The problems encountered and the practices employed in solving them may be of value and interest to others in initiating a similar program. Many of the initial steps taken were those of promoting general cleanliness and good housekeeping which served to eliminate obvious sources of contamination as well as to improve appearances, i.e., these measures included the placing of baffles on beating and refining equipment where splatter might occur, and the painting of equipment so that disorder would be more obvious and, as a result, more readily corrected.

Because very little information was available as to the sources and kinds of contamination, the first work was to investigate the existing bacteriological conditions throughout the mill. A flow sheet of the paper-making system was made and, from this, sampling points were chosen which would indicate the changes in bacterial count progressively through the system and the points which needed further investigation. A copy of the laboratory report sheet is given to show the points which were used as controls (Table I).

* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 14-17, 1944.

[1] Water Treatment Supervisor, Riegel Paper Corp.
[2] Bacteriologist, Riegel Paper Corp.

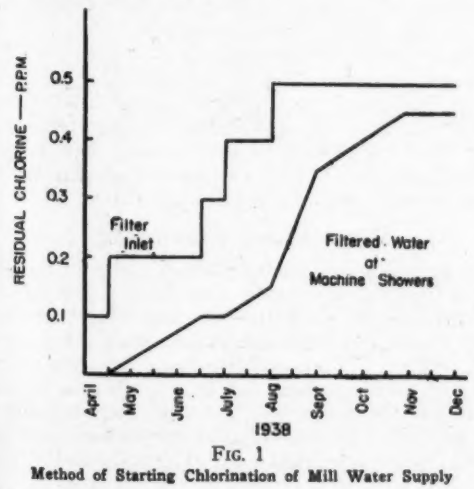

FIG. 1
Method of Starting Chlorination of Mill Water Supply

Water Supply

The water supply was made the object of the first study, since contamination from this source would be introduced at each step in the process. The source of water is the Musconetcong River which originates in Lake Hopatcong and receives pollution only from natural sources. The entrance to the treatment plant consists of a race about ¼ mile long which acts as a presedimentation basin for the 7,000,000 gallons of water which are treated daily. Near the end of the race, chemical feeders are used to add alum and lime to the water in proportion to the amount of color and turbidity present, after which coagulation and sedimentation take place in a cement lined settling basin. Norwood rapid sand filters completed the water treatment at the time the bacteriological investigation was started. Preliminary surveys of the water system showed that the water should receive further treatment to guarantee a low bacterial count.

The first step was chlorination of the water just prior to the filters. In order to avoid the possible sudden loosening of foreign material from the pipes, a small dosage of chlorine was used initially and was increased gradually until residuals were maintained throughout the water system. At the start, sufficient chlorine was added to maintain a residual of 0.1 p.p.m. in the water going to the filters. This was not sufficient to carry a residual in the filter discharge. After about 2 weeks, the chlorine dosage was increased to a residual of 0.2 p.p.m. on top of the filters. The chlorine feed was thus gradually increased over a period of about 6 months until a residual of 0.4 p.p.m. chlorine was noted in the filtered water. The way in which this increase occurred is shown in Fig. 1. This method of chlorination was found to be effective not only in delivering low count water, but also in decidedly improving the operation and cleanliness of the filters. Before chlorination, the filter wash troughs had become coated with green slime during the summer months, and the filter capacity was so impaired as to require the frequent use of sand cleaning compounds and the occasional removal of the sand for mechanical cleaning. After chlorination, the troughs and sand remained clean, and the filter capacity increased due to the prevention of the formation of mud balls in the filter sand.

Chloramine treatment was used after the initial cleaning up of the water system with the thought that the sterilizing effect would be carried farther along into the stock system. A residual of 0.5 p.p.m. at the showers on the paper machine was thought adequate. Bacteriological examination throughout the system

showed improvement in conditions, but counts on the finished paper did not reflect this improvement. Therefore, the chlorine residual at the machine showers was further increased to 1.0 p.p.m. chloramine, which was continued until Griffin *(1)* called attention to the advantages of break-point chlorination.

Experiments with this treatment indicated that its use in the filtered water would carry chlorine residuals farther, thereby improving the bacteriological condition of the entire system. When this method of chlorination was instituted, it was found that the initial point of application did not give sufficient contact time for optimum results. So, the point of application was changed to the raw water as it entered the settling pond, which increased the contact time from 1 hour to 4 hours. This increased contact time, with 1.0 p.p.m. break-point residual, was found to be most efficient in the production of low count, tasteless, and odorless water. In conjunction with break-point chlorination, a change in the design of the settling basis contributed to the uniformity of the delivered water regardless of fluctuations in the quality of the raw water. This change insured uniform distribution and eliminated channeling, thus improving coagulation during periods of high run-off. The improvement in the bacterial condition of the water resulted in a definite improvement throughout the papermaking system. For a time this improvement was reflected in the finished paper counts, but since these counts did not remain consistently low, it was evident that water treatment alone was not the solution to the maintenance of low counts throughout the process. Figure 2 shows the effect of water treatment on the paper counts. To limit the number of variables affecting the bacterial counts of the paper, the monthly log averages include only 14 to 18 one-thousandths of an inch caliper papers for food containers.

Stock System Surveys

In this mill, the pulp and broke are disintegrated, bleached, and stored in separate systems until they are blended in the beater tugboat. Surveys of the stock system had shown that the pulp as originally furnished had very low counts and that they remained low

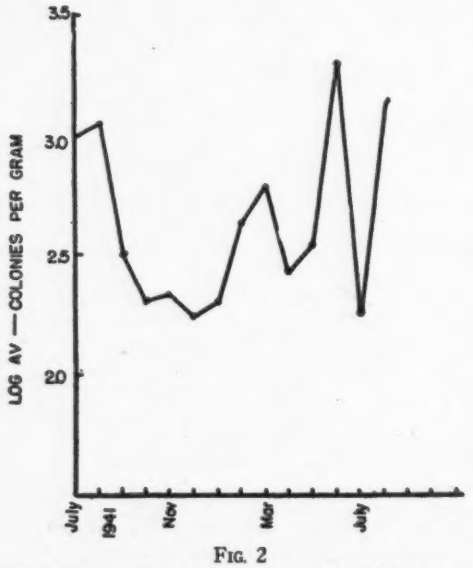

FIG. 2
Effect of Water Treatment on Bacterial Counts of Finished Paper

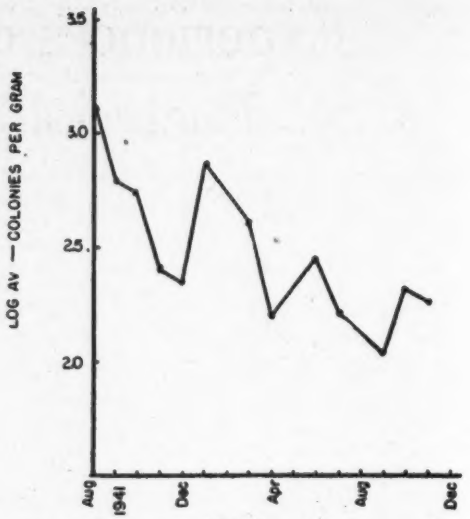

FIG. 3
Effect of White Water Chlorination on Bacterial Count of Finished Paper

through the bleaching process and up to the point were broke and starch were added in the beaters. Investigation of the broke system revealed that contamination was being introduced not only from the broke, but that an open topped broke chest was being contaminated through faulty drainage of the floor above. To correct this condition, the drains were repaired, and to prevent a possible recurrence, this chest was covered. It was found that, if the pH of the broke was lowered to 4.2 by the addition of alum, a build-up in count in the chest was prevented. To insure cleanliness, the entire broke system was sterilized with 1000 p.p.m. of chlorine as bleach liquor. This was allowed to stand for several hours in the broke beater and in the broke chest, and then was pumped through the stock system, including the vats on the machine, during each week-end shutdown before running food container paper.

Since starch was found to be another source of considerable contamination, certain practices were adopted to assure its sterility. Containers were designed for the preparation of single batches of starch. These small drums, provided with a pouring lip, were mounted on a truck so that they could be dumped directly into a beater. The drums were cleaned with live steam. After boiling the starch, sufficient bleach was added to prevent the growth of organisms.

These practices tended to eliminate the high counts in the beater furnish, and our experience has been that the count further decreased during the beating cycle after the addition of the chemicals, but, in spite of this, occasionally high counts developed in the refining system and machine storage chests.

White Water Chlorination

To maintain low counts farther along in the system, a trial was made, allowing some of the chlorine to remain in the pulp after the bleaching process to carry residual through the entire process and on to the machine. This served to keep the stock counts low, but caused serious foaming trouble on the machine, and therefore, was not a practical solution to the problem. A second trial consisted of adding bleach liquor to the head box. This reduced the count

in the vats to as low as 10, but when sufficient quantities of bleach were used to attain such low counts, foaming trouble was encountered again, and the method of application was cumbersome because of the large volume required. Substituting the direct application of chlorine gas reduced the objectionable foaming, but did not completely eliminate it, and dangers of this method of application are obvious. To overcome these objections, and to give better dispersion of the chlorine, thus increasing its effectiveness, chlorine solution feed was adopted. The solution originally was fed to the head box and to the stock dilution water. Experiments showed that the same amount of chlorine was more effective when divided and added at these points than when added at only one point. Figure 3 shows the trend of the paper counts after this treatment was instituted.

Up to this time, attempts to maintain a chlorine residual were made only when running food container papers. It was found, while using this intermittent method of chlorination, that the paper counts increased for a short time after chlorination was started. It was thought that continuous chlorination would prevent this increase by keeping the system clean and preventing build-up in counts at points of poor circulation. This was borne out by considerable increase in paper counts when continuous chlorination of the white water was first adopted, with an even greater decrease in paper counts after about 3 months.

To further increase its effectiveness by lengthening the contact time of the chlorine in the white water, the feed was further divided and added to the white water discharge of each cylinder. When this change was first made, the counts in the finished paper again increased, but after 3 months, they had decreased to a point lower than any previously obtained.

Calender Boxes

Throughout the bacteriological investigation, a great deal of attention had been paid to the condition of the calender water, since much emphasis had been placed on the recontamination of paper from this source. Several methods were tried to insure the sterility of this water. When the mill water supply contained a chlorine residual of 0.5 p.p.m., it was rechlorinated for the calenders to a residual of 2.0 p.p.m. The water boxes and pulp dams were soaked in bleach liquor before each run of food container paper to cut down contamination from this source. With this procedure, the inlet water was sterile, but a count developed in the boxes as the temperature of the water increased and the chlorine was liberated. Therefore, the water source was changed to steam condensate from the drying cylinders which was first cooled and then chlorinated. Ammonia also was added to carry the chlorine residual throughout the boxes. The water leaving the boxes was found to be sterile, but no effect was noted on the finished paper counts at this time. A further precaution taken at this step in the process consisted of installing air filters to guard against contamination from the blowers which direct cooling air against the calender rolls.

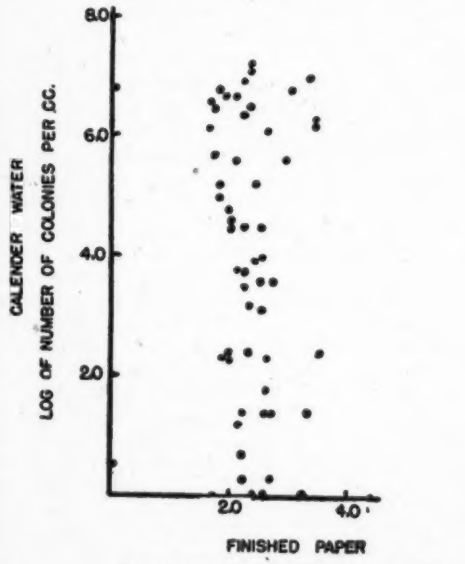

FIG. 4
Calender Water vs. Finished Paper

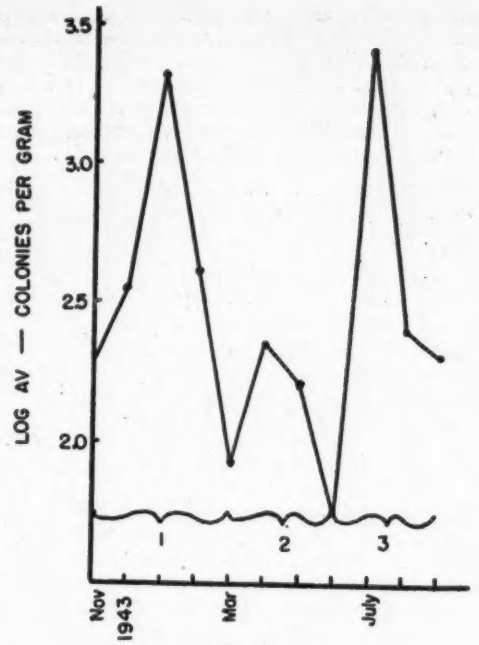

FIG. 5
Changes in Bacterial Counts of Finished Paper Due to Changes in White Water Treatment

At the advent of break-point chlorination of the mill water, the use of chlorinated condensate in the calender boxes was discontinued because it was found that the break-point chlorinated water would remain low in count and retain a chlorine residual throughout the boxes, if a sufficiently high rate of flow was maintained to prevent the development of high temperatures and the consequent liberation of the chlorine as gas. Tests were continued to determine the effect of the calender water count on the finished paper. In the accompanying diagram, (Fig. 4), where the log of the count of the calender water is plotted against the log of the finished paper count, we have been unable to observe any correlation between the two. The counts used in this diagram were taken over a period of time on various grades made on the same machine. They include those of grades other than food container papers, where high counts developed in recirculated solutions which are used on certain specialty papers to obtain desired finishes. In spite of the fact that no effect can be found on the

actual count of the paper when high counts are present in the calender water, only the filtered mill water, of drinking quality is used on papers intended for use in food containers. This practice is followed not only because of the sanitary aspect, but also because it was found that the recirculated calender solutions could impart undesirable tastes and odors to the finished paper.

When some work had been done in the company's bacteriological laboratory, it was noted that certain types of colonies consistently appeared on the agar plates from the water and on through to those of the finished paper. The most typical of these were isolated in the laboratory and, although no attempt was made to completely identify them as to species, all of those isolated were found to be aerobic spore formers. Their presence in the chlorinated water gave evidence of their resistance to this chemical, and their presence in the finished paper gave evidence of their heat resistance. Under laboratory test conditions they were found to be unusually heat resistant, some of them withstanding 1 hour at 100° C. The two most predominant types, as determined by repeated appearance on agar plates, were identified by Dr. Appling at The Institute of Paper Chemistry as *B. megatherium* and *B. mycoides,* var. The unusual heat resistance of these organisms is described by him *(2)*.

Since these spore formers are not killed by the heat of the driers, the problem was to reduce their number in the stock system in order to produce paper with a limited total agar plate count. It is believed that all of the measures outlined here have contributed to this end by keeping the entire system clean, thus preventing an increase in the numbers of these resistant types at any one point. Because the paper machine offers opportunities for build-up in counts through the recirculation of white water and the intermittent use of some of the vats with the resulting dead ends more immediate effects were noted on the finished paper counts through chlorination on the machine than through any other one treatment. Figure 5 shows the changes in paper count which were found to result from the three changes in white water chlorination. Part 1 shows the increase and subsequent decrease in counts when white water chlorination was made continuous; 2, the increase and the following greater decrease when the chlorine feed was divided and applied to the individual vats; and 3, the effect of using one vat which had not been in operation for some time, and was not chlorinated. This occurred when a new grade, requiring the use of one more vat, was first made on the machine. The resulting increase in paper count was probably because of the fact that the chlorine present in the white water system was sufficient to release the organisms that had accumulated in the vat. When this vat was chlorinated directly, a reduction in paper counts followed.

To obtain reduced counts through white water chlorination, it has been found necessary to feed sufficient chlorine to carry a residual in the vats. However, the results also show that low counts are not obtained through white water chlorination alone, for even with chlorine residuals in the vats, high paper counts result from decreased or interrupted fresh water chlorination. In conjunction with keeping all parts of the system clean, thereby preventing the accumulated growth of microorganisms, break-point chlorination of the fresh water, and controlled white water chlorination have produced the desired results on this machine. They offer the added advantages of being easily controlled and very economical.

TABLE I — BACTERIOLOGICAL SURVEY — WARREN MILL

		Run No.			
	Grade	Date			
		Time			
		Lactose			
No.	Source	1 cc.	10 cc.	E. Coli	Colonies per cc.
1	Raw Water	....	....	....	....
2	Coagulated Water	....	....	....	....
3	Filtered Water (#8 Mach. Showers)—ppm.	....	....	....	....
4	Pulp (sheet)	....	....	....	....
5	#1 Tugboat	....	....	....	....
6	Bleached Storage Chest	....	....	....	....
7	Broke Beater #86	....	....	....	....
8	Broke Beater #88	....	....	....	....
9	Broke Chest	....	....	....	....
10	Dry Starch	....	....	....	....
11	Boiled Starch	....	....	....	....
12	#2 Tugboat Pulp Furnished	....	....	....	....
13	#2 Tugboat Broke Furnished	....	....	....	....
14	#2 Tugboat Furnish (After Chemicals)	....	....	....	....
15	Stock after Jordan	....	....	....	....
16	Stock from Head Box	....	....	....	....
17	" " Vat #2	....	....	....	....
18	" " " #3	....	....	....	....
19	" " " #4	....	....	....	....
20	" " " #5	....	....	....	....
21	" " " #6	....	....	....	....
22	White Water from Vat #2	....	....	....	....
23	" " " " #3	....	....	....	....
24	" " " " #4	....	....	....	....
25	" " " " #5	....	....	....	....
26	" " " " #6	....	....	....	....
27	Wet Trim—Front	....	....	....	....
28	Wet Trim—Back	....	....	....	....
29	Calender Water Inlet Top Box—ppm.	....	....	....	....
30	Calender Water Inlet Bottom Box—ppm.	....	....	....	....
31	Calender Water Outlet Bottom Box—ppm.	....	....	....	....
32	Paper Sample (At Time of Survey)	....	....	....	....

FIG. 6

Literature Cited

1. Griffin, A. E., *Tech. Assoc. Papers,* 24:189-191 (June, 1941)
2. Appling, J. W. and Shema, B. F., *Tech. Assoc. Papers,* 25:251-255 (June, 1942)

M.I.T. Alumni Meet

The M.I.T. alumni group in TAPPI attended a luncheon at the Engineers Club, New York, N. Y. on Wednesday, February 16. S. W. Fletcher of the J. O. Ross Engineering Company presided as chairman. George Dandrow of the Johns-Manville Company and president of the Tech Club of New York described the rebuilding program going on in the New York clubhouse. Robert W. Van Kirk of Penick & Ford, Ltd., was elected chairman for the ensuing year. Those present included, in addition, Tom Price and John L. Parsons, Hammermill Paper Company, John Buss, Provincial Paper Ltd., Hermon T. Barker, Bird & Son, Inc., Albert C. Lamoureux, Dennison Manufacturing Company, E. N. Poor, W. C. Hamilton & Sons, R. B. Porter, American Cyanamid Company, M. W. Hedden, Racquette River Paper Company, A. M. Altieri, Fitchburg Paper Company, C. A. Ross, Container Corporation of America, L. H. Flett, National Aniline Division, G. R. Wadleigh, West Virginia Pulp and Paper Company, John P. Rich and E. R. Burling, Improved Paper Machinery Company, W. A. Kirkpatrick, Allied Paper Mills, Frank Maguire, Reichhold Chemicals, Don B. Kimball, Eastman Kodak Company, Paul J. Shirley, Jr., Penick & Ford Ltd., R. D. McCarron, Stein, Hall & Co., James G. Walker and W. L. Keplinger, Johns-Manville and R. G. Macdonald, TAPPI. Former chairmen were J. L. Parsons and Allen Abrams, Marathon Paper Mills.

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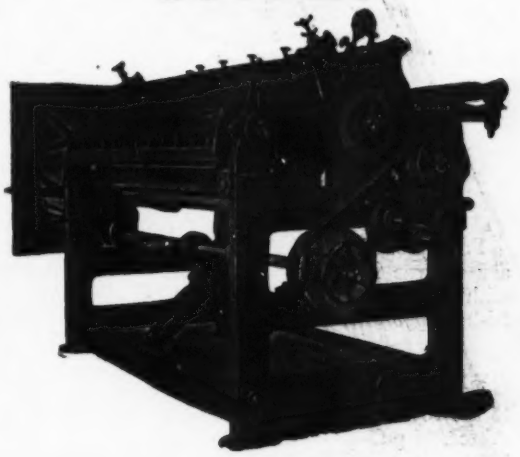

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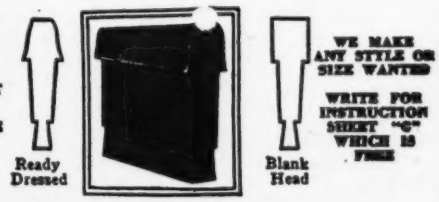

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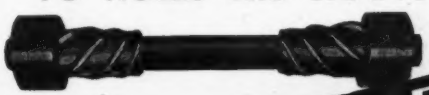

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New York Paper and Pulp Market Review

Paper Demand Continues Heavy—New Higher Prices On Many Types of Wood Pulp Are Now In Effect—New and Old Rag Markets Active—Mills Are Reported In Urgent Need of More Stock.

Office of the PAPER TRADE JOURNAL.
Wednesday, February 23, 1944.

Demand and consumption of paper continues high, with production still maintained at a relatively high level. The Department of Commerce reports that because of increased military requirements, supplies of waterproof paper are now very short. Direct and indirect war demand for the first 1944 quarter totals more than 50,000 tons of waterproof, laminated kraft, or 100% of the capacity of the 21 converting plants producing this type of paper.

Less sulphite wrapping paper for civilian use is indicated in the report of the Department of Commerce for this month, which states the quantity available for civilian use for 1944 may be 50% less than in 1942.

The index of general business activity for the week ended February 13 declined to 147.6, from 149.3 for the preceding week, compared with 135.9 for the corresponding week last year. The index of paper board production was 149.9, compared with 148.9 for the previous week, and with 136.0 for the corresponding week last year.

Paper production for the week ended February 12 was estimated at 89.6%, compared with 88.4% for 1943, with 103.4% for 1942, with 89.3% for 1941, and with 86.6% for the corresponding week for 1940.

Paper board production for the week ended February 12 was 97.0%, compared with 87.0% for 1943, with 101.0% for 1942, with 81.0% for 1941, and with 70.0% for the corresponding week for 1940.

Pulpwood

Total requirements for pulp and paper, according to the report of the Combined Pulp and Paper Committee, of pulpwood for 1944 is equivalent to 23,597,000 cords, while the combined supply is estimated at 20,956,000 cords. The deficit thus appears serious. It is yet too early to determine the result of the Victory Pulpwood Campaign, but good progress in several sections are now reported.

Wood Pulp

Shipments of wood pulp from Canada last month were, according to the Department of Commerce, retarded because of the necessity of clarifying a number of negotiation particulars, and this has created hardships for paper mills in the Northeast and in the Midwest areas.

New higher prices on several grades of wood pulp was announced last week by the OPA. Prices, effective on February 14, 1944 are as follows: bleached softwood sulphite, $86; unbleached softwood sulphite, $74; northern bleached sulphate, $86; southern unbleached sulphate, $63.50; less freight, according to OPA allowances.

Rags

Mill buying of new cotton cuttings is active at this date. All grades are in good demand. Ceiling prices prevail.

Demand for old cotton rags is quite heavy this week. Prices are strong at ceiling levels.

Old Rope and Bagging

Old Manila rope continues to be reported inadequate to meet current demand for essential uses. The Maritime Commission is distributing a pamphlet in an effort to effect a substantial conservation of Manila fiber. Ship requirements are estimated at 58,000,000 pounds of new Manila rope a year.

Demand for scrap bagging is reported moderately active this week. Volume is relatively small. Prices are a little firmer but continue nominal.

Old Waste Paper

Mill demand for old waste paper is heavy at this date. All grades are in urgent demand. Salvage drives are bringing in more waste paper but wider cooperation of individual households is evidently required to collect the larger than normal tonnage declared essential for the current year, the quota figure being 8,000,000 tons.

Twine

Demand for all grades of twine continues active, with civilian use sharply limited to the less desirable fibers and many requirements must be met with kraft paper twines.

G. G. Cobean Heads Exporters

The United States Paper Exporters Council, Inc., at its Annual Meeting held February 17 at the Waldorf elected George G. Cobean, president of Bulkley Dunton Paper Co. (S.A.), to lead this organization for the coming year. Mr. Cobean, who has had a lifetime of experience in the paper export trade, expressed confidence in the ability of the well-established and experienced American paper exporter, supported by forward-looking paper mills, to maintain and enlarge the position of American-made papers in the foreign markets. He emphasized the need for definite planning now by the industry to permanently establish the United States as a real factor among the paper-exporting nations of the world.

Mr. Eli de Vries, President of Parson & Whittemore, Inc., retiring president of the council, in a report on his stewardship stressed the post-war future of paper exporters and the representative status which this council has attained. He also stated that many of the war agencies have become increasingly aware of the essentiality of paper export in furtherance of the war effort.

The council also elected Mr. Frank W. Smith, vice president of National Paper & Type Co., as its vice president, and Mr. Fred C. Strype, president of Fred C. Strype, Inc., as its secretary-treasurer.

The new Board of Directors, in addition to the foregoing, includes Adalbert Greiner, president of China American Paper & Pulp Co., and Elwin Walker, treasurer of Walker Goulard Plehn Co., Inc.

Javits & Javits, 165 Broadway, continue as legal advisers for the council.

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Charleston, South Carolina

MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL.
Wednesday, February 23, 1944.

BLANC FIXE—The market for blanc fixe continues to conform to prevailing quotations. Current demand is reported fair. The pulp is currently quoted at $40 per ton, in barrels, at works; the powder is currently quoted at $60 per ton.

BLEACHING POWDER—Current demand is reported good. Supply situation satisfactory. Bleaching powder is currently quoted at from $2.50 to $3.10 per 100 pounds. All prices in car lots, in drums, f. o. b. works.

CASEIN—OPA maximum prices on processed acid-precipitated casein are as follows: 10,000 pounds or more, 24 cents per pound; 2,000 pounds, 2¼ cents per pound; less than 2,000 pounds, 2¾ cents per pound, f. o. b. shipping point. Imported casein 9½ cents per pound, f. o. b. source.

CAUSTIC SODA—Supply situation still tight, with production and demand reported heavy. Quotations continue unchanged. Solid caustic soda is currently quoted at $2.30 per 100 pounds. The flake and ground are currently quoted at $2.70 per 100 pounds. All prices in car lots, in drums, f. o. b. works.

CHINA CLAY—Demand for some grades of china clay is reported moderate this week. Domestic filler clay is currently quoted at from $7.50 to $15 per ton; coating clay is quoted at from $12 to $22 per ton, at mines. Imported china clay is currently quoted at from $13 to $25 per long ton, ship side.

CHLORINE—No change in the market situation has been reported this week. Production and demand well balanced. Prices unchanged. Chlorine is quoted at $1.75 per 100 pounds, in single-unit tank cars, f. o. b. works.

ROSIN—Higher prices are quoted on some grades of rosin this week. "G" gum rosin is currently quoted at $4.35 per 100 pounds, in barrels, Savannah. "FF" wood rosin is currently quoted at $4.30 per 100 pounds, in barrels, New York. Seventy per cent gum rosin is currently offered at $4.62 per 100 pounds, f. o. b. works.

SALT CAKE—Demand reported moderate. Quotations on salt cake continue to remain unchanged. Domestic salt cake is currently quoted at $15 per ton, in bulk. Chrome cake is currently quoted at $16 per ton.

SODA ASH—Market for soda ash continues to be reported as tight. Shipments improved. Prices continue to conform to prevailing quotations. Prices on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Cash corn is reported coming into market slowly due to lack of freight cars. Market still tight. Quotations continue unchanged. Pearl is currently quoted at $3.72 per 100 pounds. The powdered grade is currently quoted at $3.82 per 100 pounds. All prices f. o. b. Chicago.

SULPHATE OF ALUMINA—Market situation in sulphate of alumina is reported satisfactory. Quotations continue unchanged. Prices on the commercial grades are quoted at from $1.15 to $1.25 per 100 pounds. The iron free is currently quoted at $2.35 per 100 pounds. All prices in car lots, in bags, f. o. b. works.

SULPHUR—Demand is reported steady for sulphur. Quotations on all grades continue unchanged. Annual contracts are currently quoted at $16 per long ton, f. o. b. mines. The current contract price at Gulf Ports remains unchanged at $17.50 per long ton.

TALC—Demand is reported moderate on some grades of domestic talc at this date. The domestic grades are currently quoted at from $16 to $21 per ton, at works.

MARKET QUOTATIONS

All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March 1942, showing quotations of actual shipments, will establish the current maximum prices.

Paper

(Delivered New York)

News, per ton—

Roll, contract...	*$58.00	@	—
Sheets	64.00	"	—

* OPA Maximum Price.

Kraft—per cwt.—Carload Quantities Zone A, f.o.b. Mill

Superstandard Wrapping	*$5.25	@	—
No. 1 Wrapping...	*5.00	"	—
Standard Wrapping	*4.75	"	—
Standard Bag.....	*4.375	"	—

* OPA Manufacturers' Prices.

Tissues—Per Ream—Carlots

White No. 1.....	1.12½	"	—
White No. 1 M. G.	1.10	"	—
White No. 1½....	1.00	"	—
White No. 2.....	.90	"	—
Anti-Tarnish M.F..	1.20	"	—
Colored	—	"	—
Kraft	.95	"	—
Manila	.90	"	—

Toilet—1 M. Sheets—Per Case

Unbleached	4.25	"	—
Bleached	5.70	"	—
Unbl. Toilet, 1 M.	4.16	"	—
Bleached Toilet...	5.70	"	—

Paper Towels, Per Case—

Unbleached, Jr.....	2.20	"	—
Bleached, Jr.....	3.20	"	—

Manila—per cwt.—C. l. f. a.

No. 1 Jute.....11.25		@	—
No. 1 Manila Wrapping, 35 lb.....	6.00	"	6.25
No. 2 Manila Wrapping, 35 lb.....	5.75	"	6.00

Boards, per ton—

News	*48.00	@	—
Chip	*48.00	"	—
Sgl. Mla. Ll. Chip	*60.00	"	—
White Pat. Coated	*75.00	"	—
Kraft Liners 50 lb.	*63.00	"	—
Binders Boards....	84.00	"	116.00

* OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5.; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
100% Rag Ext. No. 1	$39.10@$46.00	$40.25@$47.25
100% Rag	32.20 " 37.75	33.35 " 39.25
85% Rag	.... "	29.90 " 35.00
75% Rag	23.00 " 27.00	24.15 " 28.25
65% Rag	.... "	22.80 " 27.75
50% Rag	18.70 " 22.75	19.90 " 24.25
25% Rag	16.40 " 20.00	17.55 " 21.50

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items. Delivered in Zone 1:

	Bonds	Ledgers
No. 1..	$10.55@$12.75	$11.70@$14.25
No. 2...	9.65 " 11.75	10.80 " 13.25
No. 3...	9.20 " 11.25	10.35 " 12.50
No. 4...	8.90 " 10.75	10.05 " 12.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper. Delivered in Zone 1:

No. 1 Glossy Coated...	$13.65	@	$15.50
No. 2 Glossy Coated...	12.40	"	14.00
No. 3 Glossy Coated...	11.60	"	13.25
No. 4 Glossy Coated...	11.15	"	12.75
No. 1 Antique (watermarked)	10.25	"	11.75
No. 2 Offset.....	9.60	"	11.00
A Grade E. F.....	9.35	"	10.75
A Grade S. & S. C....	9.60	"	11.00
B Grade E. F.....	8.85	"	10.25
B Grade S. & S. C....	9.10	"	10.50
C Grade E. F.....	8.55	"	9.75
C Grade S. & S. C....	8.80	"	10.00
D Grade E. F.....	8.25	"	9.50
D Grade S. & S. C....	8.50	"	9.75

Ivory & India at $.50 cwt. extra.

Wood Pulp

OPA Maximum Prices and Canadian Manufacturers Prices, Less Freight, Not Exceeding OPA Allowances.

Bl. Softwood Sulphite.....	$86.00
Unbl. Softwood Sulphite.....	74.00
Bl. Hardwood Sulphite.....	83.50
Unbl. Hardwood Sulphite.....	71.50
Bl. Mitscherlich.....	81.00
Unbl. Mitscherlich ...	72.00 @ 82.00
N. Bleached Sulphate.....	86.00
S. Bleached Sulphate.....	79.00
N. Semi-Bleached Sulphate...	82.00
S. Semi-Bleached Sulphate....	75.00
N. Unbl. Sulphate.....	73.00
S. Unbl. Sulphate.....	63.50
Bl. Soda	72.00
Unbl. Soda	68.00
Groundwood	50.00

Transportation Allowances Applying to Producers of Wet Wood Pulp.

	Below 50% Air Dry Weight
Northeast	$13.50
Lake Central	13.50
Southern	16.00
West Coast (in area).....	10.50
West Coast (out area).....	16.50

	50%-80% Air Dry Weight
Northeast	$11.50
Lake Central	11.50
Southern	14.00
West Coast (in area).....	9.50
West Coast (out area).....	15.50

Applying to Producers of Dry Wood Pulp.

	Above 80% Air Dry Weight
Northeast	$8.50
Lake Central	8.50
Southern	11.00
West Coast (in area).....	7.50
West Coast (out area).....	13.50

Should freight charges actually exceed these allowances, the difference may be added to the maximum prices

Domestic Rags

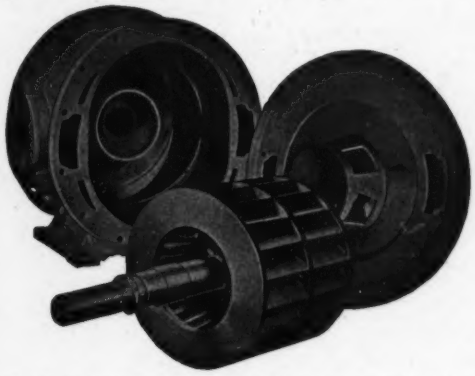
New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1..	6.50	@	7.25*
Silesias No. 1.....	—	"	5.75*
New Unbleached...	6.75	"	7.50*
Blue Overall.....	—	"	5.50*
Fancy	—	"	3.50*
Washables	—	"	3.00*
Bleached Khaki Cuttings	—	"	4.25*
Unbleached Khaki Cuttings	—	"	3.50*

* OPA Maximum Prices.

SIMPLICITY



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The Waterbury Felt Co.

SKANEATELES FALLS, N. Y.

Old Rags

White, No. 1—			
Repacked	*3.80	"	—
Miscellaneous	*3.20	"	—
White, No. 2—			
Repacked	*2.90	"	—
Miscellaneous	*2.65	"	—
Third and Blues—			
Repacked	*2.20	"	—
Miscellaneous	*1.80	"	—
Roofing Rags—			
No. 1	*1.55	"	—
No. 2	*1.45	"	—
No. 3 (bagging)	*1.35	"	—
No. 4	*1.35	"	—
No. 5A	*1.35	"	—
Old Manila Rope	5.75	"	—

OPA Maximum Prices.

Foreign Rags

All Prices nominal

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxfords	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—
No. 4 White Linens	2.25	"	3.25
No. 1 White Cotton	4.25	"	4.75
No. 2 White Cotton	3.25	"	3.75
No. 3 White Cotton	2.50	"	3.00
No. 4 White Cotton	1.90	"	2.20
Extra Light Prints	2.00	"	2.40
Ord. Light Prints	1.75	"	2.15
Med. Light Prints	1.55	"	1.95
Dutch Blue Cottons	2.25	"	2.50
French Blue Linens	3.00	"	—
Checks and Blues	2.00	"	—
Linsey Garments	1.90	"	2.00
Dark Cottons	1.50	"	1.60
Old Shopperies	1.38	"	1.45
New Shopperies	1.45	"	1.50
French Blues	2.25	"	2.50

BAGGING

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	4.25	@	4.35
Wool Tares, light	4.25	"	4.50
Wool Tares heavy	4.50	"	5.00
Bright Bagging	4.50	"	4.85
Manila Rope—			
Foreign	—	"	—
Domestic	*5.75	"	—
Jute Threads	5.50	"	—
No. 1 Sisal Strings	*4.00	"	—
Mixed Strings	2.00	"	—

* OPA Maximum Price.

Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½ @	—
No. 1 Hard White Envelope Cuts	3.12½ "	—
No. 1 Hard White Shavings, unruled	2.87½ "	—
No. 1 Hard White Shavings, ruled	2.50 "	—
Soft White Shavings, one cut	2.87½ "	—
No. 1 Soft White Shavings	2.50 "	—
Soft White Shavings, Misc.	2.15 "	—
No. 1 Fly Leaf Shavings	1.67½ "	—
No. 2 Fly Leaf Shavings	1.12½ "	—
No. 1 Groundwood Fly Leaf Shavings	1.25 "	—
No. 2 Mixed Groundwood Fly Leaf Shavings	.90 "	—
Mixed Colored Shavings	.75 "	—
Mixed Groundwood Colored Shavings	.90 "	—
Overissue Magazines	1.67½ "	—
No. 1 Heavy Books & Magazines	1.67½ "	—
Mixed Books	.85 "	—
No. 1 White Ledger	2.17½ "	—
No. 2 Mixed Ledger, colored	1.87½ "	—
New Manila Envelope Cuttings, one cut	2.87½ "	—
New Manila Envelope Cuttings	2.65 "	—
Extra Manilas	1.85 "	—
Mixed Kraft, Env. & Bag Cuttings	2.75 "	—
Kraft Envelope Cuttings	3.25 "	—
Triple Sorted, No. 1 Brown Soft Kraft	2.50 "	—
New 100% Kraft Corrugated Cuttings	2.25 "	—
No. 1 Assorted Old Kraft	1.75 "	—
New Jute Corrugated Cuttings	.90 "	—
Old 100% Kraft Corrugated Containers	1.75 "	—
Old Corrugated Containers	1.15 "	—
Box Board Cuttings	.72½ "	—
White Blank News	1.65 "	—
Overissue News	.85 "	—
No. 1 News	.75 "	—
No. 1 Mixed Paper	.70 "	—
Old Corrugated Containers	.82½ "	—
Mill Wrappers	.85 "	—

Twines

All Prices Nominal

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.21	@	—
White Hemp	.21	"	—
Fine Polished—			
Fine India	.26	"	—
Unpolished—			
Box	17¼	"	—
Paper Makers	.17	"	—
Tube Rope	19	"	—
Wall Paper	.20½	"	—
Wrapping	.23	"	—
Soft Fiber Rope	.19	"	—
Cotton	25	"	—

(Hard Fiber)

Medium Java	.18	"	—
Mex. Sisal	.16	"	—
Manila		"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill.)

Shirt Cuttings—	
New White No. 1	.07¼
New White No. 2	.05¾
Light Silesias	.05¾
Black Silesias, soft	.03¾
New Unbleached	.07½
Washable Prints	.04¼
Washable No. 1	.03
Blue Overall	.05½
Cottons—According to grades—	
Washable shredding	.01¾
Fancy Percales	.04¾
New Black Soft	.03¼
Khaki Cuttings—	
Unbleachable Cotton Cuttings	.03½
Bleachable Cotton Cuttings	.04¼
Men's Corduroy	.03½
Ladies' Corduroy	.03
Cottonades	.03¼

Domestic Rags (Old)

White No. 1—Repacked	3.80	"	—
Miscellaneous No. 1	3.20	"	—
Miscellaneous No. 2	2.65		
White No. 2—Repacked	2.90	"	—
Thirds and Blues—			
Miscellaneous	1.80	"	—
Repacked	2.20	"	—
Black Stockings—			
(Export)	Nominal		
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	1.55	"	—
Domestic No. 2	1.45	"	—
Roofing Bagging	1.35	"	—
Old Manila Rope	5.75	"	—

Bagging

(F. o. b. Phila.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.00	"	3.50
No. 1 Clean bright—			
Sisal Strings			.04
No. 2 Clean bright—			
Sisal Strings			.03
Sisal Jute	.02½	"	.02¾
Scrap—			
No. 1	3.25	"	3.50
No. 2	1.75	"	1.80
Wool Tares	4.00	"	4.25
No. 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b. Phila)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
Soft White Shavings, one cut	2.50	"	—
White Blank News	1.65	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Overissue News	.85	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.15	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	2.50	@	2.75
Sisal Rope No. 1	*4.75	"	—
Sisal Rope No. 2	*4.25	"	—
Mixed Rope	1.35	"	1.50
Transmission Rope—			
Foreign	(nominal)		
Domestic	2.75	"	3.00
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	5.25	"	—
Jute Carpet Threads	3.00	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	3.25	"	3.50
Wool Tares—			
Foreign	(nominal)		

BOSTON

Old Papers

(F. o. b. Boston)

OPA Maximum Prices

No. 1 Hard White Shavings, unruled	2.87½ @		—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Overissue News	.85	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.15	"	—
Jute Corrugated Cuttings	1.07½	"	—
Misc.	2.15	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Ledger, colored	1.87½	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
Overissue Magazines	1.67½	"	—
New Manila Envelope Cuttings	2.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Box Board Cuttings	.72½	"	—
Kraft Corrugated Cuttings	2.25	"	—
Old Corrugated Containers	1.15	"	—
Overissue News	.85	"	—
No. 1 News	1.00	"	—

Bagging

(F. o. b. Boston)

Domestic	4.25	"	
Aust. Wool Pouches	3.75	"	4.00
New Burlap Cuttings	4.75	"	5.00
Heavy Baling Bagging	4.00	"	4.25
Paper Mill Bagging	2.50	"	3.00
No. 2 Bagging	1.35	"	— *

* OPA Maximum Price.

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.04½ @		.04¾
Fancy Percales	.04¼ "		.05
New White No. 1	.06¾ "		.07
New Light Flannelettes	.05½ "		.06
Canton Flannels, Bleached	.06 "		.06½
Underwear Cutters, Bleached	.06¼ "		.06¾
Underwear Cutters, Unbleached	.05¼ "		.06
Silesias No. 1	.06 "		.06¼
New Black Silesias	.03 "		.03½
Red Cotton Cuttings	.03½ "		.04
Soft Unbleached Blue Cheviots	.06½ "		.06¾
	.05½ "		.06
Fancy	.02¾ "		—
Washable	.02¾ "		—
Khaki Cuttings	.02¾ "		.03
O. D. Khaki	.03½ "		.03¾
Corduroy	.03¼ "		.03¾
New Canvas	.06¼ "		.06¾
B. V. D. Cuttings	.06¼ "		.06¾

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80 @		— *
Miscellaneous	3.20 "		— *
White No. 2—			
Miscellaneous	2.65 "		— *
Twos and Blues, Repacked	2.20 "		— *
Old Blue Overalls	2.25 "		2.50
Thirds and Blues, Repacked	2.20 "		— *
Miscellaneous	1.80 "		— *
Black Stockings	3.50 "		4.00
Roofing Stock—			
No. 1	1.55 "		— *
No. 2	1.45 "		— *
No. 3	1.35 "		— *
No. 4	1.35 "		— *
No. 5, Quality A	1.35 "		— *
Quality B	1.20 "		— *
Quality C	.95 "		— *
Old Manila Rope	5.75 "		—

* OPA Maximum Prices.

Foreign Rags

(F. o. b Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices.

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	1.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
No. 1 White Ledger	2.17½	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
White Blank News	1.65	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
No. 1 Assorted Old Kraft	1.75	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
No. 1 Roofing Rags	1.55	"	—
No. 1 Roofing Bags	1.45	"	—